

Report 11421  
9 March 1999

**GENCORP**  
**AEROJET**

**Integrated Advanced Microwave Sounding Unit-A  
(AMSU-A)**

**Performance Verification Report**

**AMSU-A1 Antenna Drive Subsystem**

**P/N 1331720-2, S/N 107**

**Contract No. NAS 5-32314  
CDRL 208**

**Submitted to:**

**National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771**

**Submitted by:**

**Aerojet  
1100 West Hollyvale Street  
Azusa, California 91702**

**Aerojet**



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## AMSU-A VERIFICATION TEST REPORT

TEST ITEM: AMSU- A1 ANTENNA DRIVE SUBSYSTEM  
PART OF P/N: 1331720-2  
SERIAL NUMBER : 107

LEVEL OF ASSEMBLY: SUBASSEMBLY AND COMPLETE INSTRUMENT ASSEMBLY

TYPE HARDWARE: FLIGHT

VERIFICATION: AE-26002/1E  
PROCEDURE NO.

TEST DATE:

SUBSYSTEM: START DATE: 27 Jan 1999  
FINISH DATE: 17 Feb 1999

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## 1.0 INTRODUCTION

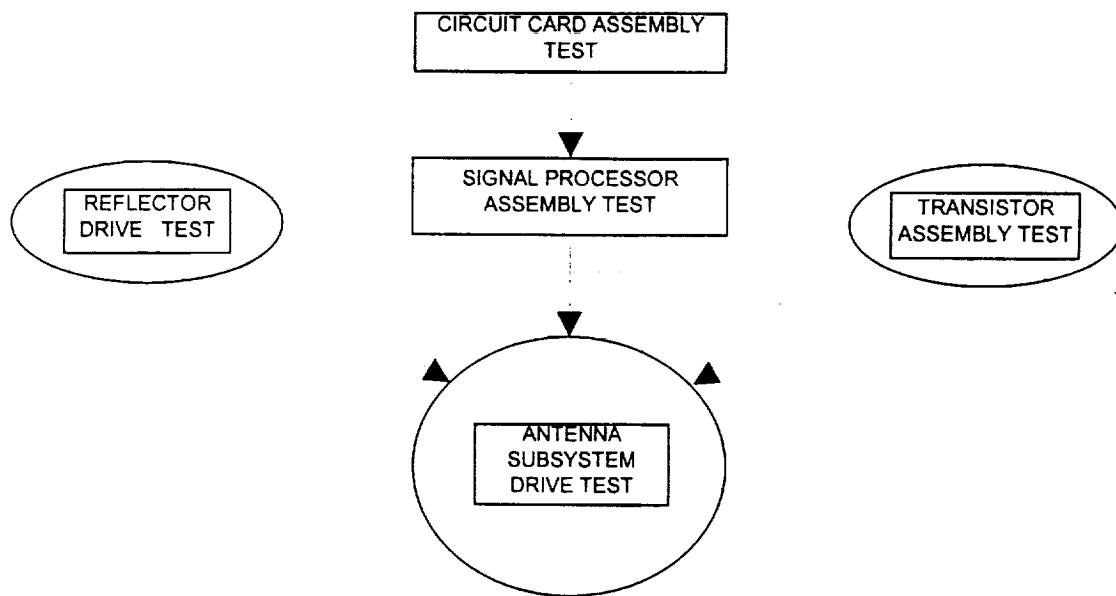
An antenna drive subsystem test was performed on the METSAT AMSU-A1, S/N 107 instrument. The objective of the test was to demonstrate compliance with applicable paragraphs of AMSU-A specifications S-480-80. Tests were conducted at both the subassembly and instrument level.

## 2.0 SUMMARY

The antenna drive subsystem of the METSAT AMSU-A1, S/N 107, P/N 1331720-2, completed acceptance testing per AES Test Procedure AE-26002/1E. The test included: Scan Motion and Jitter, Pulse Load Bus Peak Current and Rise Time, Resolver Reading and Position Error, Gain/ Phase Margin, and Operational Gain Margin.

The drive motors and electronic circuitry

were also tested at the component level. The drive motor test includes: Starting Torque Test, Motor Commutation Test, Resolver Operation/ No-Load Speed Test, and Random Vibration. The electronic circuitry was tested at the Circuit Card Assembly (CCA) level of production; each test exercised all circuit functions. The transistor assembly was tested during the W3 cable assembly (1356941-1) test. Refer to Figure 1 for test flow.



Antenna Subsystem and Subsystem Component Test Flow  
Figure 1.

The antenna drive subsystem satisfactorily passed all of the performance requirements. There were no failures in any of the antenna drive components during subsystem testing.

The results of the subsystem and component level testing are discussed in more detail in the following sections:

Reflector Drive Assembly.....	5.1
Circuit Card Assemblies .....	5.2
Signal Processor.....	5.3
Transistor Assembly .....	5.4
Antenna Drive Subsystem.....	5.5

### 3.0 TEST CONFIGURATION

The **Reflector Drive Assembly Tests** confirm the operability of the motor under test. The test configuration includes the motor, motor shaft, bearings, and a supporting housing.

The **Circuit Card Assembly (CCA) Tests** confirm the operability of each CCA. Each test includes the CCA under test, electronic test fixtures, and the necessary loads.

A segment of the **Signal Processor Tests** ensures the scan drive electronics are functioning properly prior to its assembly into the instrument. The test configuration includes:

- Timing and Control CCA
- Scan Control Interface CCA
- Relay Driver and Current Monitor CCA
- Interface Converter CCA
- Resolver Data Isolator CCA
- R/D Converter CCA
- Motor Driver CCA
- Test fixture and cabling to simulate the spacecraft bus interface
- Test fixture and cabling to interrogate and analyze positional data
- Test motor and inertia wheel

The **Transistor Assembly Test** verifies the correct wiring of the transistor assembly and associated cabling. Test configuration includes the CKT 1000 (continuity and Hi-Pot tester), and test fixtures.

The Antenna Drive Subsystem Tests:

- Are configured with the same motor control CCA's used in the signal processor test, interconnecting wiring, the power transistor assembly, and the drive assembly with reflector.
- The antenna drive subsystem components were all installed in the instrument when the subsystem test was performed.

- DC power for the motor control circuit cards was provided by a DC/DC converter simulator P/N: 1359322-1. The simulator operates on 120VAC facility supplied power. The power for the reflector motor drive circuits however was provided directly by the STE 28V Bus power supply.

#### 4.0 TEST SETUP

The antenna drive subsystem tests are performed during system integration. During system integration testing, the instrument is proven electrically safe via ground isolation, and power distribution checks. Next, the communication link is exercised to ensure commands are received and interpreted correctly. The Antenna Drive Subsystem Test is then performed.

#### 5.0 TEST RESULTS

The Antenna Drive Subsystem components designated for use in the METSAT AMSU-A1 instrument are shown in Table 1.

CCA (A1-1)	S/N
Resolver Data Isolator Assembly (A1-1)	F21
Interface Converter Assembly (A1-1)	F27
Motor Driver Assembly (A1-1)	F04
R/D Converter/ Oscillator Assembly (A1-1)	F22

CCA (A1-2)	S/N
Resolver Data Isolator Assembly (A1-2)	F31
Interface Converter Assembly (A1-2)	F34
Motor Driver Assembly (A1-2)	F11
R/D Converter/ Oscillator Assembly (A1-2)	F25

OTHER	S/N
Reflector Drive Motor (A1-1)	F11
Reflector Drive Motor (A1-2)	F10
Signal Processor	F03

Table 1.  
METSAT AMSU-A1 S/N: 107 Antenna  
Subsystem Component S/N Designations

All components designated for use in the METSAT AMSU-A1 instrument (pertaining to the scan drive circuitry) passed on the first time through component testing.

## 5.1 REFLECTOR DRIVE ASSEMBLIES

The tests performed on this unit are: Starting Torque Test, Motor Commutation Test, Resolver Operation/ No-Load Speed Test, and Random Vibration. The Motor Commutation and Resolver Operation tests are performed both pre and post-vibration.

### Starting Torque

Both reflector drive assemblies (F10 and F11) passed the starting torque test at ambient temperature as well as at the colder plateaus first time through testing.

### Motor Commutation Test

This test is performed to determine the commutation characteristics of the motor under test. Both reflector drive assemblies (F10 and F11) passed the motor commutation test both pre- and post-vibration tests without incident.

### Resolver Operation/ No-Load Speed Test

This test is performed to verify resolver operation as well as speed characteristics and back electromotive force of the motor. Both reflector drive assemblies (F10 and F11) passed the resolver operation/ no-load speed test both pre- and post-vibration tests without incident.

### Random Vibration

Reflector drive assemblies (F10 and F11) passed vibration testing first time through. The motor assembly also passed the pre- and post-vibration electronic tests as well as the post-vibration visual inspection without incident.

## 5.2 CIRCUIT CARD ASSEMBLIES

Test procedures were prepared for each motor control circuit card; document revision status is controlled by reference in the shop order. The cards were individually tested to the procedures and results were recorded on data sheets found in Appendix A. The following list indexes the CCA Test Data Sheets:

- *Appendix A1 .....* *Resolver Data Isolator Assembly (A1-1)*
- *Appendix A2 .....* *Resolver Data Isolator Assembly (A1-2)*
- *Appendix A3 .....* *Interface Converter Assembly (A1-1)*
- *Appendix A4 .....* *Interface Converter Assembly (A1-2)*

- *Appendix A5..... Motor Driver Assembly (A1-1)*
- *Appendix A6..... Motor Driver Assembly (A1-2)*
- *Appendix A7..... R/D Converter/ Oscillator Assembly (A1-1)*
- *Appendix A8..... R/D Converter/ Oscillator Assembly (A1-2)*

All circuit card assemblies passed testing the first time through. The assembly build shop orders contain the part number and accept tag record the of test and select resistors.

### **5.3 SIGNAL PROCESSOR**

For the first time, the entire antenna drive motor electronics is mated together. The test instrumentation commands and interrogates the electronics during this segment of testing. The instrumentation sends position commands to the Interface Converter CCA. The Interface Converter D/A's the command and provides inputs to the Motor Driver CCA. The test motor (instrumentation) responds to the drive signal and feeds back positional data via resolver outputs. The instrumentation then interrogates the Resolver Data Isolator CCA for position data. A comparison is made in the instrumentation between the position command sent and the actual position received. The pass/ fail indication is presented to the operator for test data sheet recording.

The signal processor assembly (F03) passed all scan drive tests.

### **5.4 TRANSISTOR ASSEMBLY**

All transistor assemblies are tested along with their respective W3 cable. The cable is continuity, then hi-pot tested prior to attaching the transistor circuitry. Each transistor pair is exercised validating the turn on voltage, current drawn, and cable wiring as well.

The W3 cable and transistor assembly underwent component testing and passed without incident.

### **5.5 ANTENNA SUBSYSTEM DRIVE TESTS**

The antenna drive motor electronics mates with the instrument microprocessor for the first time during this segment of testing. The microprocessor sends position commands from the memory CCA to the Interface Converter CCA. The Interface Converter D/A's the command and provides inputs to the Motor Driver CCA. The Reflector Drive Motor responds to the drive signals and feeds back positional data via the resolver outputs. The microprocessor then interrogates the Resolver Data Isolator CCA for position data. The microprocessor in turn communicates with the spacecraft interface.

During other segments of the test, positional data is monitored via a potentiometer attached to the shaft of each reflector drive assembly. This provides scan characteristic information in regard to overshoot, jitter, and beam position transition timing for each motor assembly.

The remaining paragraphs in this section discuss tests that ensures the instrument complies with specific operating parameters. Prior to conducting these tests there is a series of preliminary checks that are run to select component values that customize the operating parameters of each motor. These checks perform the following functions:

- Program “on board” memory with Beam Position Pointing Angles for each reflector drive assembly
- Adjust for peak Motor Current Limits on both A1-1 and A1-2 motor drive circuits
- Observe Preliminary Scan Dynamics on both A1-1 and A1-2 motor drive circuits
- Identify Mechanical Resonant Frequencies of each reflector drive assembly

**Beam Position Pointing Angles** are calculated from Nadir pointing direction which is determined on the antenna range. The instrument’s EPROMs (EPROMs for testing; PROMs for final configuration) are programmed to reflect the position commands. The initial programming may require fine tuning; fine tuning is determined during the remaining segments of the test procedure.

**Motor Current Limits** were adjusted, via selecting “test and select” resistors, to comply with the specification requirement; less than 1.1 amp peak current.

**Preliminary Scan Dynamics** looked good; transition times, overshoot and jitter were all acceptable at the sampled pointing directions (5).

The **Mechanical Resonant Frequencies** were identified; notch filters were calculated and installed to compensate for these resonant frequencies.

### 5.5.1 SCAN MOTION AND JITTER

In this test, the antenna position was measured in a series of five 8-sec full scans. The measurement was made with a 1-turn test potentiometer temporarily affixed to the rear end of the motor shaft. A Dynamic Signal Analyzer (DSA) was connected to the pot wiper to record the antenna position data. Five scans of each A1-1 and A1-2 were captured and stored on the AMSU-A1 Test Data File disc. One representative waveform from each subassembly is presented in Appendix B1 (A1-1) and Appendix B34 (A1-2).

Each 3.33 degrees scene step was expanded and checked for both a 35 msec max step time, and a 165 msec integration period. Expanded waveforms were plotted and are presented in Appendix B2 thru B31 for the A1-1 subassembly and Appendix B35 thru

B64 for the A1-2 subassembly. All of the scene steps meet the step response requirement for transition time, overshoot, and jitter.

Slew periods to the cold and warm calibration stations were measured and met requirements. A time of 0.21 sec is allocated for the 35.0 degree slew to cold cal, and 0.40 sec for the 96.67 degree slew to warm cal. Calibration station jitter was less than the  $\pm 5\%$  maximum permitted. Expanded waveforms for each subassembly were plotted and are presented in Appendix B32 and B33 (A1-1) and Appendix B65 and B66 (A1-2). The waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix B67 (A1-1) and B68 (A1-2).

### **5.5.2 PULSE LOAD BUS PEAK CURRENT AND RISE TIME**

The Pulse Load pulse load bus peak current and the rate of change of current were measured. The peak current must be less than 1A at any beam position along the scan. Peak current along the scan is .9368A. The current rate of change while transitioning from one beam position to the next (including the transition to the cold calibration and warm calibration targets) should be greater than 35 microseconds. A random  $3.33^\circ$  step was selected; the transition to the next step was 2.344 ms. The transition to the warm cal position start and stop was significantly longer than the required 35 ms; 1.953 and 2.344 ms, respectively.

The peak bus current was measured across the entire scan and met the requirement. The full scan waveform was plotted and is presented in Appendix C1. The waveform is also stored on the AMSU-A1 Test Data File disc. The test data sheet is presented in Appendix C2.

### **5.5.3 RESOLVER READING AND POSITION ERROR**

The 14-bit command position word is stored in the "on-board" memory and is read to the motor drive circuitry under microprocessor program control. The microprocessor also reads the resolver output at each of the thirty scene stations, and at the cold and warm calibration positions. The readings are made at the start of integration (LOOK 1), and halfway into the integration period (LOOK 2). The resolver data is sent to the spacecraft interface for subsequent transmission to the STE.

The purpose of this portion of the test is to demonstrate that the antenna is meeting beam pointing requirements.

If the antenna is out of the pointing tolerance of  $> \pm 5$  counts at LOOK 2, the EPROM is reprogrammed to bring the pointing direction to within the prescribed tolerances. A copy of the STE computer print out showing the pointing direction is shown in Figure 2 for the A1-1 subassembly and Figure 3 for the A1-2 subassembly.

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
1	16251	16253	16253	2	2
2	19	17	19	-2	0
3	171	168	171	-3	0
4	322	323	323	1	1
5	474	473	473	-1	-1
6	626	623	625	-3	-1
7	777	779	778	2	1
8	929	931	930	2	1
9	1081	1081	1080	0	-1
10	1232	1234	1234	2	2
11	1384	1384	1384	0	0
12	1536	1538	1537	2	1
13	1687	1688	1688	1	1
14	1839	1840	1840	1	1
15	1991	1991	1992	0	1
16	2142	2145	2144	3	2

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
17	2294	2298	2295	4	1
18	2446	2448	2448	2	2
19	2597	2598	2598	1	1
20	2749	2750	2750	1	1
21	2901	2901	2901	0	0
22	3052	3051	3050	-1	-2
23	3204	3205	3205	1	1
24	3356	3355	3357	-1	1
25	3507	3511	3509	4	2
26	3659	3662	3660	3	1
27	3811	3811	3812	0	1
28	3962	3965	3964	3	2
29	4114	4115	4115	1	1
30	4266	4267	4268	1	2
CC1	5860	5860	5860	0	0
WC	10259	10258	10258	-1	-1

\* Difference between Command and Actual

Figure 2. Beam Position Pointing Directions and Error Calculation for A1-1

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
1	403	401	401	-2	-2
2	555	553	554	-2	-1
3	707	711	709	4	2
4	858	856	858	-2	0
5	1010	1011	1012	1	2
6	1162	1161	1161	-1	-1
7	1313	1314	1315	1	2
8	1465	1467	1466	2	1
9	1617	1619	1618	2	1
10	1768	1765	1766	-3	-2
11	1920	1923	1921	3	1
12	2072	2071	2070	-1	-2
13	2223	2221	2225	-2	2
14	2375	2373	2375	-2	0
15	2527	2528	2529	1	2
16	2678	2680	2680	2	2

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
17	2830	2829	2828	-1	-2
18	2982	2987	2984	5	2
19	3133	3130	3133	-3	0
20	3285	3287	3287	2	2
21	3437	3441	3439	4	2
22	3588	3588	3590	0	2
23	3740	3737	3738	-3	-2
24	3892	3894	3894	2	2
25	4043	4044	4045	1	2
26	4195	4195	4197	0	2
27	4347	4344	4346	-3	-1
28	4498	4497	4500	-1	2
29	4650	4651	4652	1	2
30	4802	4806	4804	4	2
CC1	6396	6399	6399	3	3
WC	10795	10794	10794	-1	-1

\* Difference between Command and Actual

Figure 3. Beam Position Pointing Directions and Error Calculation for A1-2

#### 5.5.4 GAIN/PHASE MARGIN

A gain/phase margin test was performed on the antenna drive subsystem. The test was performed by obtaining a Bode plot of the control loop and measuring the gain at 180° phase differential and the phase margin at the 0db crossover point.

The Dynamic Signal Analyzer (DSA) was used to make the measurement operating in the swept sine mode. Three separate Bode plots were made on the antenna and the gain and phase margins were determined from each plot. The gain margin measured was 14.505 db (average of three) for the A1-1 subsystem and 14.226 db (average of three) for the A1-2 subsystem. The phase margin measured was 67.623° (average of three) for the A1-1 subsystem and 70.063° (average of three) for the A1-2 subsystem. These margins exceed the specification requirements of 9.2 db and 25 degrees and therefore are acceptable. The three Bode waveforms were plotted and are presented in Appendix D1 thru D3 for the A1-1 subsystem and Appendix D4 thru D6 for the A1-2 subsystem. The waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix D7 and D8 for A1-1 and A1-2, respectively.

#### 5.5.5 OPERATIONAL GAIN MARGIN

An operational gain margin test was performed on the instrument three times. This test consists of increasing the gain of the control loop until oscillation occurs. The gain increase and frequency of oscillation are measured. An increase in gain greater than 8 db is required; the frequency of oscillation is an observation.

A 50K pot was connected in series with the R58 feedback resistor on amplifier AR8. The resistance of the test pot was slowly added to the feedback resistor while observing the reflector for oscillations.

The reflector begins to produce an audible sound as gain is increased. The following added resistance values are calculated to have the following gain margins for the A1-1 and A1-2 subsystems:

Resistance (ohms)	Gain
35.93 K	9.0 db
37.34 K	9.2 db
37.39 K	9.2 db

A1-1

Resistance (ohms)	Gain
38.90 K	9.4 db
37.56 K	9.2 db
37.61 K	9.2 db

A1-2

The first mode mechanical resonance of the shaft and reflector is about 95 Hz for the A1-1 subsystem. The power spectrum waveform was plotted and is presented in Appendix E1. The first mode mechanical resonance of the shaft and reflector is about 94 Hz for the A1-2 subsystem. The power spectrum waveform was plotted and is presented in Appendix E2. These waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix E3 and E4 for the A1-1 and A1-2 subsystems respectively.

## 6.0 CONCLUSION

Based on the test results, it can be concluded that the METSAT AMSU-A1 S/N 107 antenna drive subsystem meets the AMSU-A specification requirements.

## 7.0 TEST DATA

Test data for the METSAT AMSU-A1 S/N 107 obtained in the antenna drive subsystem test is attached. Data sheet number and type of test is shown in the following Appendix Index.

**APPENDIX INDEX**

- Appendix A1 .....* *Resolver Data Isolator CCA TDS (A1-1)*  
*Appendix A2 .....* *Resolver Data Isolator CCA TDS (A1-2)*  
*Appendix A3 .....* *Interface Converter CCA TDS (A1-1)*  
*Appendix A4 .....* *Interface Converter CCA TDS (A1-2)*  
*Appendix A5 .....* *Motor Driver CCA TDS (A1-1)*  
*Appendix A6 .....* *Motor Driver CCA TDS (A1-2)*  
*Appendix A7 .....* *R/D Converter/ Oscillator CCA TDS (A1-1)*  
*Appendix A8 .....* *R/D Converter/ Oscillator CCA TDS (A1-2)*  
  
*Appendix B1 .....* *Full Scan Step Response (A1-1)*  
*Appendix B2 thru B31 .....* *Single Step Responses (A1-1)*  
*Appendix B32 .....* *Cold Calibration Step Response (A1-1)*  
*Appendix B33 .....* *Warm Calibration Step Response (A1-1)*  
*Appendix B34 .....* *Full Scan Step Response (A1-2)*  
*Appendix B35 thru B64.....* *Single Step Responses (A1-2)*  
*Appendix B65 .....* *Cold Calibration Step Response (A1-2)*  
*Appendix B66 .....* *Warm Calibration Step Response (A1-2)*  
*Appendix B67 .....* *Scan Motion Jitter Test TDS (A1-1)*  
*Appendix B68 .....* *Scan Motion Jitter Test TDS (A1-2)*

*Appendix C1.....Peak Pulse Load Bus Current Waveform*

*Appendix C2.....Pulse Load Bus Current TDS*

*Appendix D1 thru D3.....Gain/ Phase Margin Bode Plots (A1-1)*

*Appendix D4 thru D6.....Gain/ Phase Margin Bode Plots (A1-2)*

*Appendix D7.....Gain/ Phase Margin TDS (A1-1)*

*Appendix D8.....Gain/ Phase Margin TDS (A1-2)*

*Appendix E1 .....Operational Gain Margin Power Spectrum (A1-1)*

*Appendix E2 .....Operational Gain Margin Power Spectrum (A1-2)*

*Appendix E3 .....Operational Gain Margin TDS (A1-1)*

*Appendix E4 .....Operational Gain Margin TDS (A1-2)*

**APPENDIX A**

***TEST DATA SHEETS FOR SCAN DRIVE CIRCUIT  
CARD ASSEMBLIES***



TEST DATA SHEET B-6 (Sheet 1 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Date: 7/28/97  
S/N: F21  
1334972-1

6.6.7.1 Supply Voltages

Supply*	Measured Value (V)	Limits (Vdc)	Pass/Fail
+5 V (I)	+5.06V	± 0.25	P
+5 V (U)	+5.00V	± 0.25	P

6.6.7.2 Supply Currents

Steps 1 and 2:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	53.49	100 max	P
+5 V (U)	323.70	400 max	P

Steps 3 and 4:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	83.05	150 max	P
+5 V (U)	12.11	30 max	P

\* I = Isolated, U = Unisolated

6.6.7.3 Resolver Data

Bit No.	Pass/Fail
API 0 - AP Bit 0	P
API 1 - AP Bit 1	P
API 2 - AP Bit 2	P
API 3 - AP Bit 3	P
API 4 - AP Bit 4	P
API 5 - AP Bit 5	P
API 6 - AP Bit 6	P
API 7 - AP Bit 7	P
API 8 - AP Bit 8	P
API 9 - AP Bit 9	P
API 10 - AP Bit 10	P
API 11 - AP Bit 11	P
API 12 - AP Bit 12	P
API 13 - AP Bit 13	P

6.6.7.4 Converter Busy Pulse

Converter Busy Pulse	Measured Value (usec)	Limits (usec)	Pass/Fail
15.0	14.6	± 3.0	P

TEST DATA SHEET B-6 (Sheet 2 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7 )

Comments:

None

Conducted by:

Dennis Lur  
Test Engineer

7/28/97

Date

(24)  
269

Verified by:

Judie Harvey  
Quality Control Inspector

07/29/97

Date

Approved by:

Russell Dennis  
DCMC

7/29/97

Date

TEST DATA SHEET B-6 (Sheet 1 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7 )

Date: 7/24/97  
S/N: F31  
1334972-1

6.6.7.1 Supply Voltages

Supply*	Measured Value (V)	Limits (Vdc)	Pass/Fail
+5 V (I)	+5.00	$\pm 0.25$	P
+5 V (U)	+5.06	$\pm 0.25$	P

6.6.7.2 Supply Currents

Steps 1 and 2:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	53.44	100 max	P
+5 V (U)	316.59	400 max	P

Steps 3 and 4:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	83.07	150 max	P
+5 V (U)	12.00	30 max	P

\* I = Isolated, U = Unisolated

6.6.7.3 Resolver Data

Bit No.	Pass/Fail
API 0 - AP Bit 0	P
API 1 - AP Bit 1	P
API 2 - AP Bit 2	P
API 3 - AP Bit 3	P
API 4 - AP Bit 4	P
API 5 - AP Bit 5	P
API 6 - AP Bit 6	P
API 7 - AP Bit 7	P
API 8 - AP Bit 8	P
API 9 - AP Bit 9	P
API 10 - AP Bit 10	P
API 11 - AP Bit 11	P
API 12 - AP Bit 12	P
API 13 - AP Bit 13	P

6.6.7.4 Converter Busy Pulse

Converter Busy Pulse	Measured Value ( $\mu$ sec)	Limits ( $\mu$ sec)	Pass/Fail
15.0	14.6	$\pm 3.0$	P

TEST DATA SHEET B-6 (Sheet 2 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7 )

Comments:

NONE

Conducted by:

Dennis Lee

Test Engineer

7/28/97

Date

Verified by:

Judith Harvey (24  
285)  
Quality Control Inspector

07/29/97

Date

Approved by:

Ronald Thomas  
DCMC

7/29/97

Date

TEST DATA SHEET B-13 (Sheet 1 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

Date: 8/7/97  
CCA S/N: F27

6.13.7.1 Supply Voltages

Supply	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
+5V (U)	5.01	+5V± 0.05	P
+15V (I)	15.01	+15V± 0.15	P
-15V (I)	-14.97	-15V± 0.15	P
+5V (I)	5.02	+5V± 0.05	P

6.13.7.2 Supply Currents

Step 1 (CP and API Low):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	86.62	70 - 110	P
+5V (I)	3.40	1.5 - 5.5	P
+15V (I)	18.50	15 - 23	P
-15V (I)	21.16	18 - 26	P

Step 2 (CP and API High):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	56.52	40 - 70	P
+5V (I)	23.97	18 - 30	P
+15V (I)	18.50	15 - 23	P
-15V (I)	21.16	18 - 26	P

6.13.7.3 Amplifier Offsets

Amplifier	Measured Value (mV)	Limits (mV)	Pass/Fail
AR1	-0.02	0.0±0.15	P
AR2	-0.45	0.0±2.0	P

## TEST DATA SHEET B-13 (Sheet 2 of 3)

## INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

## 6.13.7.4 Subtraction and D-A Conversion

*unstunned*  
9-10-97

$\pm 0.00015$   
 $\pm 0.00060$   
 $\pm 0.00030$

Step 1:

Actual Position (API) MSB      LSB	Command Position (CP) MSB      LSB	AR1 Output Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
0000000000000000	0000000000000000	0.00000	-0.000020	P
0000000000000001	0000000000000000	-0.00061	-0.000492	P
0000000000000010	0000000000000000	-0.00122	-0.001124	P
0000000000000011	0000000000000000	-0.00184	-0.001749	P
00000000000000100	0000000000000000	-0.00245	-0.002378	P
000000000000001000	0000000000000000	-0.00490 *	-0.004891	P
0000000000000010000	0000000000000000	-0.00979 *	-0.009913	P
00000000000000100000	0000000000000000	-0.01958 *	-0.019968	P
000000000000001000000	0000000000000000	-0.03917 *	-0.040072	P
0000000000000010000000	0000000000000000	-0.07834 *	-0.080279	P
0000000000000000000000	0000000000000000	-0.15667 *	-0.16065	P
00000000000000000000000	0000000000000000	-0.31334 *	-0.32147	P
000000000000000000000000	0000000000000000	-0.62669 *	-0.64314	P
0010000000000000	0000000000000000	-1.25338 *	-1.2865	P
0100000000000000	0000000000000000	-2.50675 *	-2.5732	P
1000000000000000	0000000000000000	-5.01350 *	-5.1463	P

\* Tolerance on output voltage is  $\pm 10\%$ 

*unstunned*  
9-10-97

$\pm 0.00015$   
 $\pm 0.00060$   
 $\pm 0.00030$

Step 2:

Actual Position (API) MSB      LSB	Command Position (CP) MSB      LSB	AR1 Output Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
0000000000000000	0000000000000000	0.00000	-0.00034	P
0000000000000001	0000000000000001	0.00061	+0.00030	P
0000000000000010	0000000000000001	0.00122	+0.001208	P
0000000000000011	0000000000000001	0.00184	+0.001827	P
00000000000000100	0000000000000001	0.00245	+0.002461	P
000000000000001000	0000000000000001	0.00490 *	+0.004977	P
0000000000000010000	0000000000000001	0.00979 *	+0.009934	P
00000000000000100000	0000000000000001	0.01958 *	+0.020080	P
000000000000001000000	0000000000000001	0.03917 *	+0.040182	P
0000000000000000000000	0000000000000001	0.07834 *	+0.080367	P
00000000000000000000000	0000000000000001	0.15667 *	+0.16084	P
000000000000000000000000	0000000000000001	0.31334 *	+0.32169	P
0000000000000000000000000	0000000000000001	0.62669 *	+0.64347	P
00000000000000000000000000	0000000000000001	1.25338 *	+1.2863	P
000000000000000000000000000	0000000000000001	2.50675 *	+2.5725	P
0000000000000000000000000000	0000000000000001	-5.01350 *	-5.1463	P

\* Tolerance on output voltage is  $\pm 10\%$

TEST DATA SHEET B-13 (Sheet 3 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.5 Strobe Function

Step 1: Strobe Low

No E11 Change  
with Input CP Changes

Pass/Fail  
P

Step 2: Strobe High

E11 Change  
with Input CP Changes

Pass/Fail  
P

6.13.7.6 Amplifier Gain

	<u>Measured Value (Vdc)</u>	<u>Limits (Vdc)</u>	<u>Pass/Fail</u>
E11	<u>0.32167</u>	-	<u>P</u>
E10	<u>3.5464</u>	-	<u>P</u>
E10 Voltage	<u>11.0</u>	10.7 - 11.3	<u>P</u>
E11 Voltage			

6.13.7.7 Ground Isolation

	<u>Measured Value (MΩ)</u>	<u>Limits (MΩ)</u>	<u>Pass/Fail</u>
Pin 91 to Pin 7 DC Resistance	<u>larger than (150 MΩ)</u>	>20	<u>P</u>

Comments:

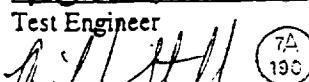
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Conducted by:

Dennis Lien

8/7/97

Date  
08 13 '97

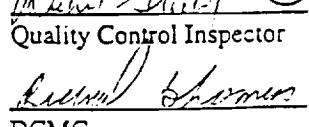
Test Engineer  
  
7A  
190

Verified by:

Theresa H. Shum

8/7/97

Date  
08 13 '97

Quality Control Inspector  


Approved by:

Ronald Shumers

8/14/97

Date  
08 14 '97

DCMC

TEST DATA SHEET B-13 (Sheet 1 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

Date: 8/21/97  
CCA S/N: F34  
1331697-1

6.13.7.1 Supply Voltages

Supply	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
+5V (U)	5.01	+5V± 0.05	P
+15V (I)	15.01	+15V± 0.15	P
-15V (I)	-14.97	-15V± 0.15	P
+5V (I)	5.02	+5V± 0.05	P

6.13.7.2 Supply Currents

Step 1 (CP and API Low):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	86.45	70 - 110	P
+5V (I)	3.34	1.5 - 5.5	P
+15V (I)	18.01	15 - 23	P
-15V (I)	20.71	18 - 26	P

Step 2 (CP and API High):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	56.50	40 - 70	P
+5V (I)	23.90	18 - 30	P
+15V (I)	18.01	15 - 23	P
-15V (I)	20.71	18 - 26	P

6.13.7.3 Amplifier Offsets

Amplifier	Measured Value (mV)	Limits (mV)	Pass/Fail
AR1	- 0.08	0.0±0.15	P
AR2	- 0.06	0.0±2.0	P

## TEST DATA SHEET B-13 (Sheet 2 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

## 6.13.7.4 Subtraction and D-A Conversion

Step 1:

Actual Position (API) MSB      LSB	Command Position (CP) MSB      LSB	ARI Output Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	-0.00085	P
00000000000001	00000000000000	-0.00061	-0.00638	P
00000000000010	00000000000000	-0.00122	-0.001272	P
00000000000011	00000000000000	-0.00184	-0.001910	P
000000000000100	00000000000000	-0.00245	-0.002543	P
0000000000001000	00000000000000	-0.00490 *	-0.005062	P
00000000000010000	00000000000000	-0.00979 *	-0.010103	P
000000000000100000	00000000000000	-0.01958 *	-0.020200	P
0000000000001000000	00000000000000	-0.03917 *	-0.040387	P
00000000000010000000	00000000000000	-0.07834 *	-0.080763	P
000000000000100000000	00000000000000	-0.15667 *	-0.16150	P
0000000000001000000000	00000000000000	-0.31334 *	-0.32301	P
00000000000010000000000	00000000000000	-0.62669 *	-0.64610	P
0010000000000000	00000000000000	-1.25338 *	-1.2924	P
0100000000000000	00000000000000	-2.50675 *	-2.5847	P
1000000000000000	00000000000000	-5.01350 *	-5.1693	P

\* Tolerance on output voltage is  $\pm 10\%$ 

Step 2:

Actual Position (API) MSB      LSB	Command Position (CP) MSB      LSB	ARI Output Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	-0.00083	P
000000000000000	000000000000001	0.00061	+0.000536	P
000000000000000	000000000000010	0.00122	+0.001168	P
000000000000000	000000000000011	0.00184	+0.001794	P
000000000000000	0000000000000100	0.00245	+0.002424	P
000000000000000	0000000000001000	0.00490 *	+0.004943	P
000000000000000	00000000000010000	0.00979 *	+0.010020	P
000000000000000	000000000000100000	0.01958 *	+0.02016	P
000000000000000	0000000000001000000	0.03917 *	+0.040302	P
000000000000000	00000000000010000000	0.07834 *	+0.080675	P
000000000000000	000000000000100000000	0.15667 *	+0.16148	P
000000000000000	000000000000010000000	0.31334 *	+0.32305	P
000000000000000	0001000000000000	0.62669 *	+0.64627	P
000000000000000	0010000000000000	1.25338 *	+1.2921	P
000000000000000	0100000000000000	2.50675 *	+2.5843	P
000000000000000	1000000000000000	-5.01350 *	-5.1693	P

\* Tolerance on output voltage is  $\pm 10\%$

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19 Jun 97

TEST DATA SHEET B-13 (Sheet 3 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.5 Strobe Function

Step 1: Strobe Low

No E11 Change  
with Input CP Changes

Pass/Fail  
P

Step 2: Strobe High

E11 Change  
with Input CP Changes

Pass/Fail  
P

6.13.7.6 Amplifier Gain

	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
E11	<u>0.32306</u>	-	<u>P</u>
E10	<u>3.5664</u>	-	<u>P</u>
E10 Voltage	<u>11.04</u>	10.7 - 11.3	<u>P</u>
E11 Voltage			

6.13.7.7 Ground Isolation

	Measured Value (MΩ)	Limits (MΩ)	Pass/Fail
Pin 91 to Pin 7 DC Resistance	<u>&gt; 150MΩ</u>	>20	<u>P</u>

Comments:

NONE

Conducted by:

Dennis Linn

8/21/97

Date

74  
1997

Verified by:

Micheal Stilwell

OCT 10 '97

Date

Approved by:

Richard Sherman

10/14/1997

Date

## TEST DATA SHEET B-4 (Sheet 1 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: F04  
 Date: 8/21/97  
1331694-3

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	1.769 mV	0.0 ±1 mVdc
6	1.372 mV	0.0 ±1 mVdc
8	1.513 mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	3.16K
	E9-E10 (R52)	6.04K
	E11-E12 (R33)	2.80K
	E13-E14 (R53)	4.72K
	E15-E16 (R42)	3.16K
	E17-E18 (R54)	5.23K

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC 55J3161FS
	R52	RNC 55J6041FS
	R33	RNC 55J2801FS
	R53	RNC 55J4221FS
	R42	RNC 55J3161FS
	R54	RNC 55J5231FS

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	-0.038 mV	0.0 ±1 mVdc	PASS
	E20	+0.020 mV	0.0 ±1 mVdc	PASS
	E21	-0.015 mV	0.0 ±1 mVdc	PASS

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	5.01V	+5V ±0.05Vdc	PASS
	52.6mA	70mAadc max	PASS
	15.0V	+15V ±0.15Vdc	PASS
	1.5mA	3.0mAadc max	PASS
	-14.97V	-15V ±0.15Vdc	PASS
	18.44mA	25mAadc max	PASS
	28.0V	+28V ±0.5Vdc	PASS
	5.6mA	8mAadc max	PASS
3	280mV	400mVdc max	PASS
4	40mA	50mAadc max	PASS
5	48mA	50mAadc max	PASS

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19 Jun 97

TEST DATA SHEET B-4 (Sheet 2 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	271 mV	400mVdc max	PASS
4	36 mA	50mAdc max	PASS
5	40 mA	50mAdc max	PASS

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
3	450 mA	350-500mAdc	PASS

Comments:

NONE

Conducted by:

Dennis Law

Test Engineer

8/21/97

Date

Verified by:

Judie Terrey (269)

Quality Control Inspector

09/03/97

Date

Approved by:

Ronald Sones

DCMC

9/3/97

Date

## TEST DATA SHEET B-4 (Sheet 1 of 2)

## MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: F11  
 Date: 8/21/97  
1331694-3

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	+1.02 mV	0.0 ±1 mVdc
6	+0.65 mV	0.0 ±1 mVdc
8	+1.03 mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	4.22k
	E9-E10 (R52)	6.04k
	E11-E12 (R33)	N/A
	E13-E14 (R53)	N/A
	E15-E16 (R42)	3.74k
	E17-E18 (R54)	5.62k

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC55J422IFS
	R52	RNC55J604IFS
	R33	N/A
	R53	N/A
	R42	RNC55J374IFS
	R54	RNC55J562IFS

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	+0.098 mV	0.0 ±1 mVdc	PASS
	E20	+0.649 mV	0.0 ±1 mVdc	PASS
	E21	-0.063 mV	0.0 ±1 mVdc	PASS

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	5.01V	+5V ±0.05Vdc	PASS
	52.44mA	70mAdc max	PASS
	15.00V	+15V ±0.15Vdc	PASS
	1.53mA	3.0mAdc max	PASS
	-14.97V	-15V ±0.15Vdc	PASS
	18.37mA	25mAdc max	PASS
	28.00V	+28V ±0.5Vdc	PASS
	5.61mA	8mAdc max	PASS
3	270mV	400mVdc max	PASS
4	41mA	50mAdc max	PASS
5	47mA	50mAdc max	PASS

19 Jun 97

## TEST DATA SHEET B-4 (Sheet 2 of 2)

## MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	230 mV	400mVdc max	PASS
4	35mA	50mAdc max	PASS
5	40mA	50mAdc max	PASS

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
3	450 mA	350-500mAdc	PASS

Comments:

None

Conducted by:

Dennis Linn  
Test Engineer8/21/97

Date

Verified by:

Judie Harvey  
Quality Control Inspector09/03/97

Date

Approved by:

William J. Jones  
DCMC9/3/97

Date

TEST DATA SHEET B-5 (Sheet 1 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

Date 4/14/98  
CCA S/N F22

6.5.7.1 UUT Pre-Test

Step 2:

Supply Currents (Without UUT)

Supply (Vdc)	(Baseline) Measured Value (mA) (Without UUT)	Limits (mA)	Pass/Fail
+15	0.06	0-1	P
-15	-0.28	-1 - 0	P
+5	0.06	0-1	P

Supply Voltages (Without UUT)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.018	± 0.50	P
-15V (I)	-15.016	± 0.50	P
+5V (I)	5.033	± 0.25	P

Step 6:

Supply Currents (UUT Installed)

Supply (Vdc)	Measured Value (mA) (UUT Installed)	Difference (mA) (Measured - Baseline)	Limits (mA)	Pass/Fail
+15	27.81	27.75	20-40	P
-15	-37.47	-37.19	-30 - -50	P
+5	62.88	62.82	30-70	P

6.5.7.2 Supply Voltages (UUT Installed)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.012	± 0.50	P
-15V (I)	-14.973	± 0.50	P
+5V (I)	5.018	± 0.25	P

6.5.7.3 Oscillator Frequency, Duty Cycle, and Output Voltage

Parameter	Measured Value	Limits	Pass/Fail
Frequency	1613.6	1550-1650 Hz	P
Duty Cycle	51.41	45-55 %	P
Output Voltage	8.147	7.6-8.4 Vrms	P

TEST DATA SHEET B-5 (Sheet 2 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.4 R-D Converter Operation

Step 1:

Bit Number/ Test Fixture Label	CW Pass/Fail	CCW Pass/Fail
API 0/1	P	P
API 1/2	P	P
API 2/3	P	P
API 3/4	P	P
API 4/5	P	P
API 5/6	P	P
API 6/7	P	P
API 7/8	P	P
API 8/9	P	P
API 9/10	P	P
API 10/11	P	P
API 11/12	P	P
API 12/13	P	P
API 13/14	P	P
Converter Busy	P	P

Step 2:

RS (E10)	Measured Value (Vdc)	Calculated Value (Vdc) * CCA -1 Assy	Calculated Value (Vdc) * CCA -2 Assy	Pass/Fail
CW Rotation	1.78	(+) 1.789	(+) NA	P
CCW Rotation	-1.815	(-) -1.789	(-) NA	P

\* Signal level function of test and calibration gain resistors. Record calculated value and measured value. Measured value shall be within  $\pm 20$  percent of calculated value. The equation is as follows:

is a

$$V = \pm 0.155 \left( \frac{R_{20}}{R_{17}} \right) \pm 20\%$$

6.5.7.5 Amplifier Gain

PES-RS	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
PES = +0.300 Vdc	1.105	1.00 to 1.30	P
PES = -0.300 Vdc	1.135	1.00 to 1.30	P

6.5.7.6 Direction Control Signal

DIR CNTRL	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
CW Rotation	5.001	4.5 to 5.5	P
CCW Rotation	0.129	0.0 to 0.4	P

## TEST DATA SHEET B-5 (Sheet 3 of 3)

## R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

## 6.5.7.7 Notch Filter Frequency Response

Frequency	Measured Value (Hz)	Calculated Value (Hz) * CCA -1 Assy	Calculated Value (Hz) * CCA-2 Assy	Pass/Fail
AR3 Notch	NA	NA	NA	NA
AR4 Notch	↓	↓	↓	↓
AR5 Notch	↓	↓	↓	↓

\* Notch frequencies shall be within  $\pm 3$  percent of values determined by test and calibration resistors. Record calculated and measured values.

## Comments:

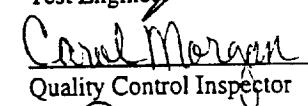
6.5.7.7 DONE AT NEXT  
LEVEL AS ALLOWED IN  
AE-26693 p. 53

Conducted by:


  
Test Engineer
4/14/98

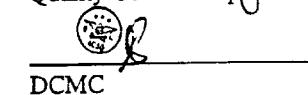
Date

Verified by:


  
Quality Control Inspector
4/14/98

Date

Approved by:


  
DCMC
APR 13 1998

Date

TEST DATA SHEET B-5 (Sheet 1 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

Date 4/14/98  
CCA S/N E25

6.5.7.1 UUT Pre-Test

Step 2:

Supply Currents (Without UUT)

Supply (Vdc)	(Baseline) Measured Value (mA) (Without UUT)	Limits (mA)	Pass/Fail
+15	0.06	0-1	P
-15	-0.28	-1 - 0	P
+5	0.06	0-1	P

Supply Voltages (Without UUT)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.018	± 0.50	P
-15V (I)	-15.016	± 0.50	P
+5V (I)	5.033	± 0.25	P

Step 6:

Supply Currents (UUT Installed)

Supply (Vdc)	Measured Value (mA) (UUT Installed)	Difference (mA) (Measured - Baseline)	Limits (mA)	Pass/Fail
+15	31.87	31.81	20-40	P
-15	-37.81	-37.57	-30 - -50	P
+5	55.3	55.24	30-70	P

6.5.7.2 Supply Voltages (UUT Installed)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.01	± 0.50	P
-15V (I)	-14.972	± 0.50	P
+5V (I)	5.019	± 0.25	P

6.5.7.3 Oscillator Frequency, Duty Cycle, and Output Voltage

Parameter	Measured Value	Limits	Pass/Fail
Frequency	1630.17	1550-1650 Hz	P
Duty Cycle	51.26	45-55 %	P
Output Voltage	8.362	7.6-8.4 Vrms	P

TEST DATA SHEET B-5 (Sheet 2 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.4 R-D Converter Operation

Step 1:

Bit Number/ Test Fixture Label	CW Pass/Fail	CCW Pass/Fail
API 0/1	P	P
API 1/2	P	P
API 2/3	P	P
API 3/4	P	P
API 4/5	P	P
API 5/6	P	P
API 6/7	P	P
API 7/8	P	P
API 8/9	P	P
API 9/10	P	P
API 10/11	P	P
API 11/12	P	P
API 12/13	P	P
API 13/14	P	P
Converter Busy	P	P

Step 2:

RS (E10)	Measured Value (Vdc)	Calculated Value (Vdc) * CCA -1 Assy	Calculated Value (Vdc) * CCA -2 Assy	Pass/Fail
CW Rotation	1.753	(+) 1.789	(+) NA	P
CCW Rotation	-1.812	(-) -1.789	(-) NA	P

\* Signal level function of test and calibration gain resistors. Record calculated value and measured value. Measured value shall be within  $\pm 20$  percent of calculated value. The equation is as follows:

is a

$$V = \pm 0.155 \left( \frac{R20}{R17} \right) \pm 20\%$$

6.5.7.5 Amplifier Gain

PES-RS	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
PES = +0.300 Vdc	1.094	1.00 to 1.30	P
PES = -0.300 Vdc	-1.154	1.00 to 1.30	P

6.5.7.6 Direction Control Signal

DIR CNTRL	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
CW Rotation	5.002	4.5 to 5.5	P
CCW Rotation	0.115	0.0 to 0.4	P

TEST DATA SHEET B-5 (Sheet 3 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.7 Notch Filter Frequency Response

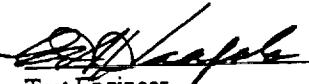
Frequency	Measured Value (Hz)	Calculated Value (Hz) * CCA -1 Assy	Calculated Value (Hz) * CCA-2 Assy	Pass/Fail
AR3 Notch	NA	NA	NA	NA
AR4 Notch	↓	↓	↓	↓
AR5 Notch	↓	↓	↓	↓

\* Notch frequencies shall be within  $\pm 3$  percent of values determined by test and calibration resistors. Record calculated and measured values.

Comments:

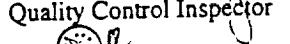
6.5.7.7 DONE AT NEXT  
LEVEL AS ALLOWED IN  
AE-26693 p.53

Conducted by:

  
Test Engineer

4/14/98  
Date

Verified by:

  
Quality Control Inspector

4/15/98  
Date

Approved by:

  
DCMC

APR 15 '98  
Date

**APPENDIX B**

***SCAN MOTION AND JITTER RESPONSE PLOTS***



# Time Capture

MEASURE:	CHAN 1	CHAN 2
	Power Spec	OFF
WINDOW:	CHAN 1	CHAN 2
	Hanning	Hanning
AVERAGE:	TYPE	OVERLAP
	Avg Off	0%
FREQ:	CENTER	SPAN
	500 Hz	1.0 kHz
		BW
		1.87 Hz
REC:	LGTH	
	800ms	
TRIGGER:	TYPE	SLOPE
	External	Neg
INPUT:	TYPE	LEVEL
CH 1	AutoRng↑	0.0 Vpk
CH 2	AutoRng↑	
SOURCE:	TYPE	OFFSET
	Off	0.0 Vpk

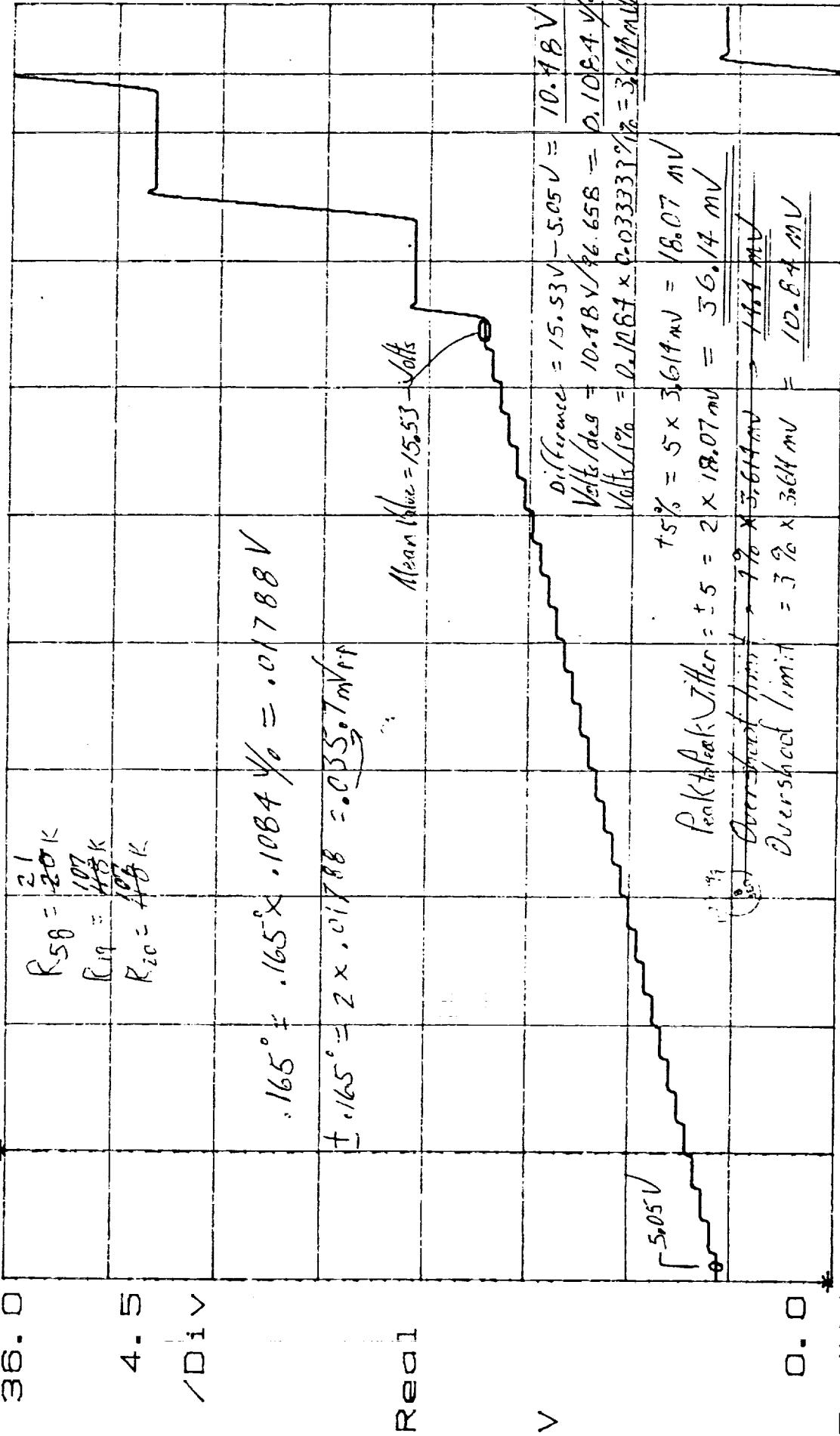
STO: 033110  
D/N: 13317202-2-IT SN: 102

Test Env: 8 ms

Rate: 1-20-9/

Qualit: Good

X = 5.9645 Sec  
Y = 15.5306 V  
CAP TIM BUF  
36.0



$$R_{58} = \frac{21}{20} K$$

$$C_{19} = \frac{107}{403} K$$

$$R_{10} = 403 K$$

4.5  
10 Div

$$.165^\circ + .165^\circ \times .1084\% = .01788 V$$

$$\pm .165^\circ = 2 \times .01788 = .035507 mVpp$$

Real

$$\text{Mean Value} = 15.53 \text{ Volts}$$

V

$$\text{Difference} = 15.53 V - 5.05 V = 10.48 V$$

$$\text{Volts/deg} = 10.48 V / 16.658 = 0.644 V/^\circ$$

$$\text{Volts/1\%} = 0.1084 \times 0.033333 \frac{1}{1\%} = 3.611 mV/1\%$$

$$+5\% = 5 \times 3.611 mV = 18.05 mV$$

$$-5\% = 2 \times 18.07 mV = 36.14 mV$$

$$\text{Peak-to-Peak Jitter} = \pm 5$$

*not from front front*

*overshoot limit*

*undershoot limit*

*overshoot limit*

Fixd XY 0.0 Sec

A/-1 7AP\_F S11

3.737.5-

8.0  
Aut. 1-10.00

Att. 1-10.00  
8.0  
Qualit.

Att. 1-10.00  
8.0  
Qualit.

Att. 1-10.00  
8.0  
Qualit.

R1-1  
JUN 29  
R1-1  
JUN 29

# Time Capture

<b>MEASURE:</b>	CHAN 1	CHAN 2
	Power Spec	OFF
<b>WINDOW:</b>	CHAN 1	CHAN 2
	Hanning	Hanning
<b>AVERAGE:</b>	TYPE	# AVG'S
	Avg	OFF
		10
<b>FREQ:</b>	CENTER	
	500 Hz	
	REC LGTH	Δt
	800ms	391 μS
<b>TRIGGER:</b>	TYPE	LEVEL
	External	0.0 VPK
<b>INPUT:</b>	RANGE	ENG UNITS
CH 1	AutoRng↑	1.0 V/ΕU
CH 2	AutoRng↑	1.0 V/ΕU
<b>SOURCE:</b>	TYPE	LEVEL
	OFF	0.0 VPK
<i>STO:</i>	<u>123/120</u>	<u>Test Eng:</u> <u>3.4.5 - 78</u>
<i>PHM:</i>	<u>123/120-6-IT</u>	<u>SLV:</u> <u>102</u>
		<i>Date:</i> <u>1-10-97</u>
		<i>Scrl:</i> <u>1</u>
		<i>Page:</i> <u>1</u>

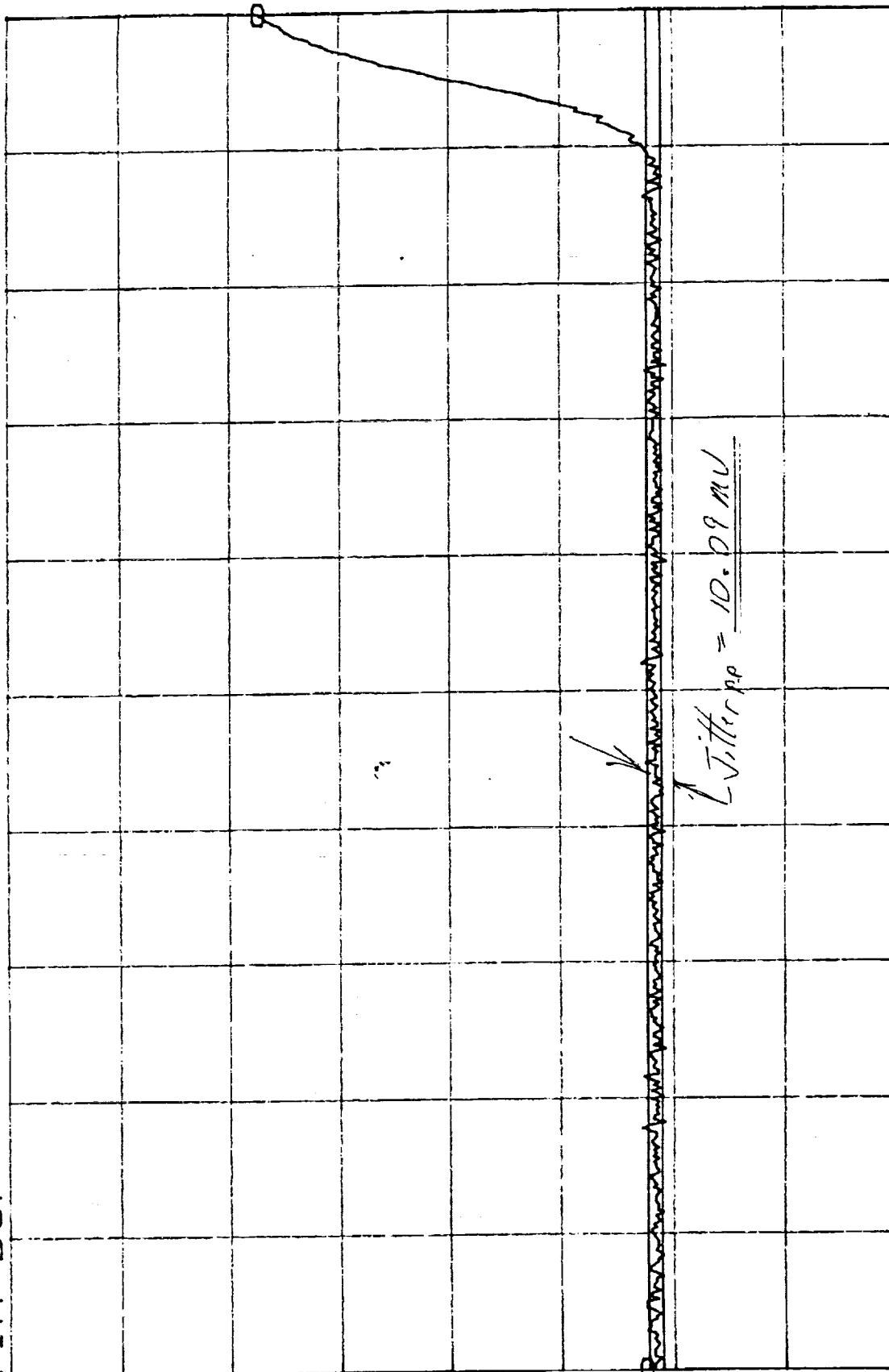
$X = 4.687 \text{ mS}$     $\Delta X = 1.86.3 \text{ mS}$   
 $Y = 5.06658$     $\Delta Y = 2.79.0 \text{ mV}$

$\gamma = 5.05528$     $\Delta \gamma = 10.09 \text{ mV}$

CAP TIM BUF

5.53

80.0 m  
/□ i v



4.89

Fx dXY 4.69m Sec

5/10. 633170

SC1

Test Eng'g  
Date 1-20-99  
Quality Good

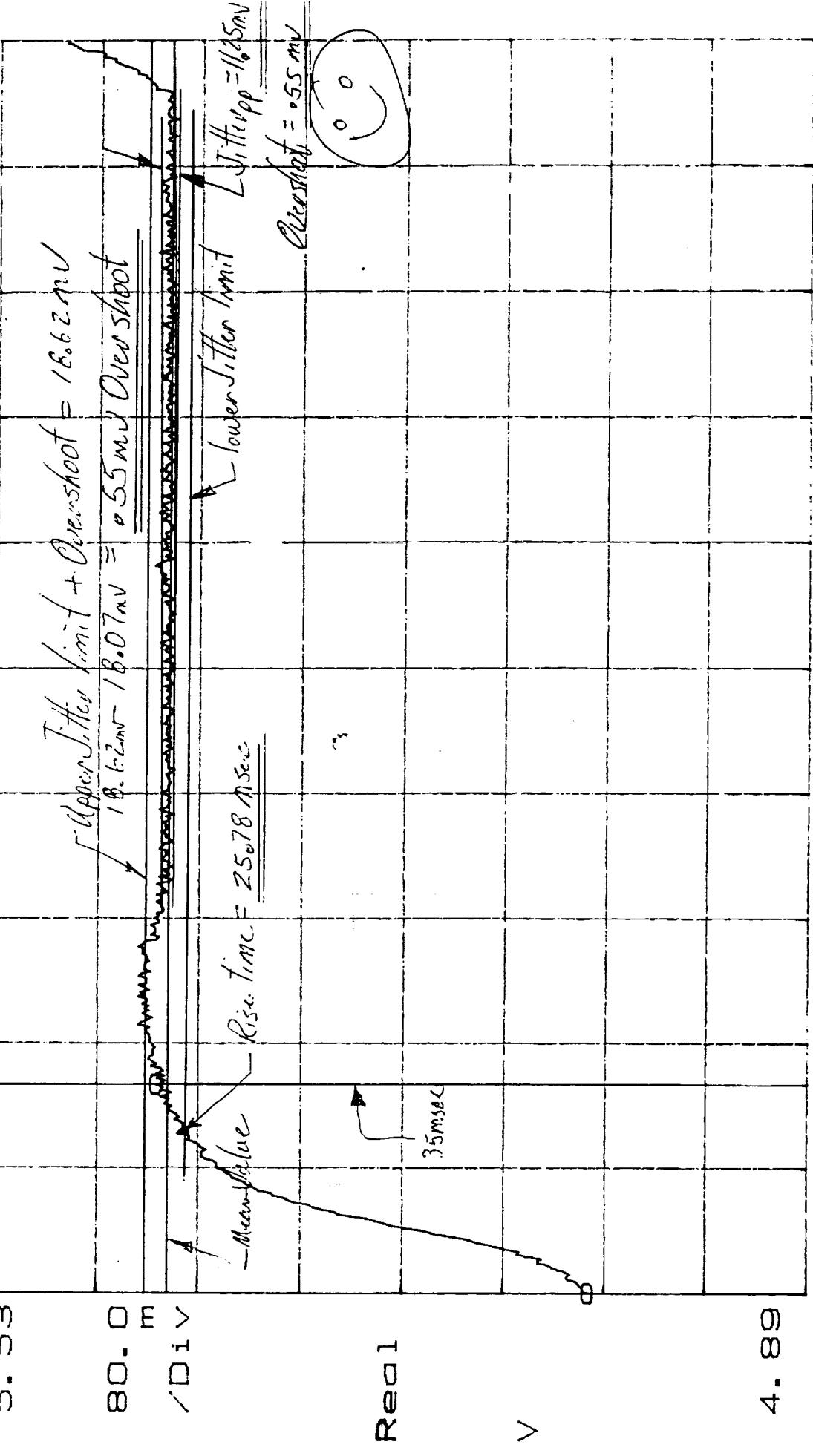
AN 1331720-7-17 21111111

Alt 1

Printed 11/24/99

$X = 170.7 \text{ mS}$   $\Delta X = 35.16 \text{ mS}$   $Y = 5.40989$   $\Delta Y = 18.62 \text{ mV}$

CAP TIM BUF  
5.53



4. 89

Fxxdy 633/170

Sec 171 34.4.5

SC1 2 Test Eng. (b) self

381m Shift 1-20:19

Mar 15/2022-17 3.1' 107

Qual. 2

13

$X = 370.7 \text{ ms}$     $\Delta X = 35.16 \text{ ms}$     $Y = 5.75758$     $\Delta Y = 13.96 \text{ mV}$

CAP TIM BUF

80.0  
/ Di V

Real

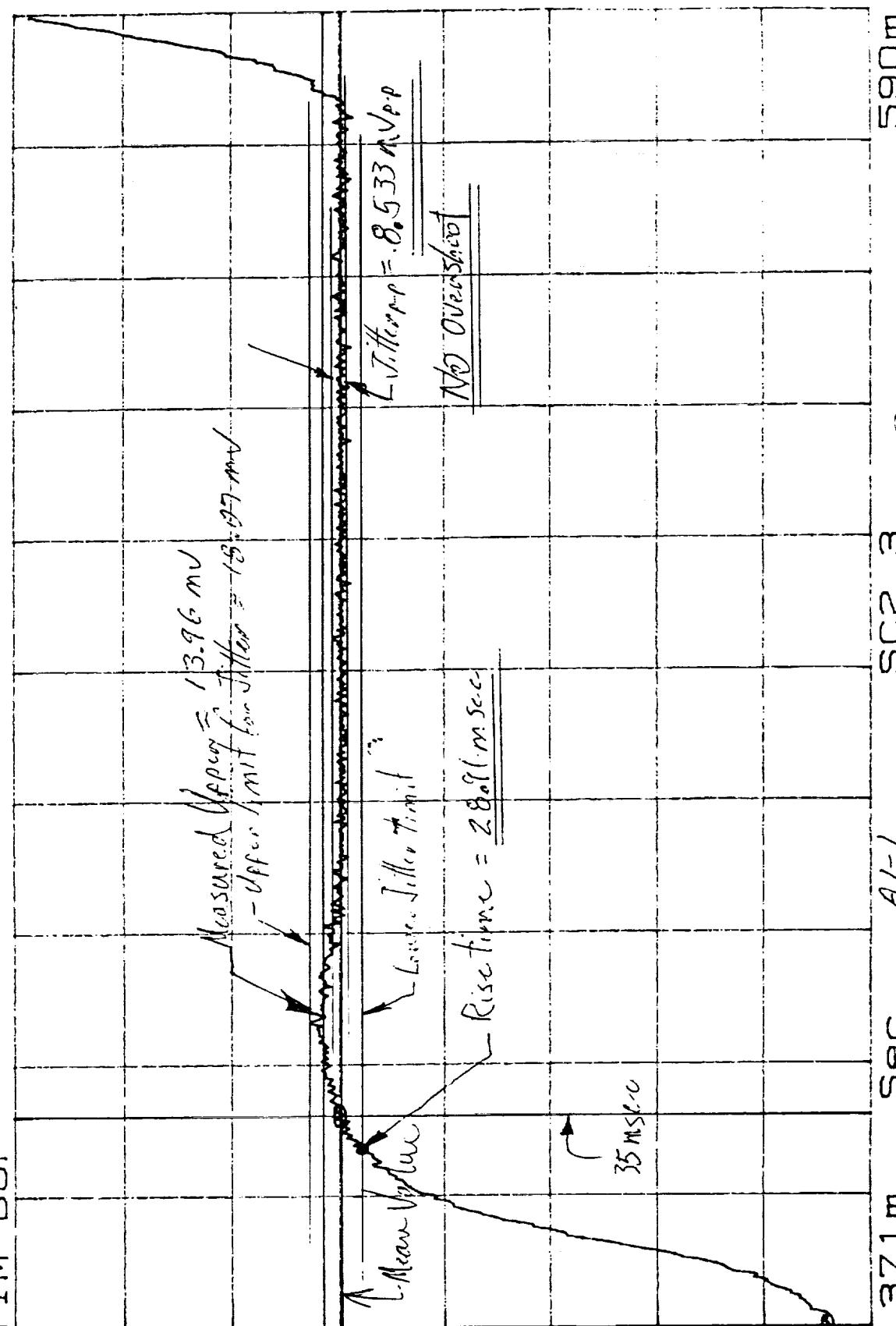
V

5.360

FxD X 371m Sec A1-1

5.1.4.5

5/17/2021 5:41:17



AMSU  
B  
SPLIT

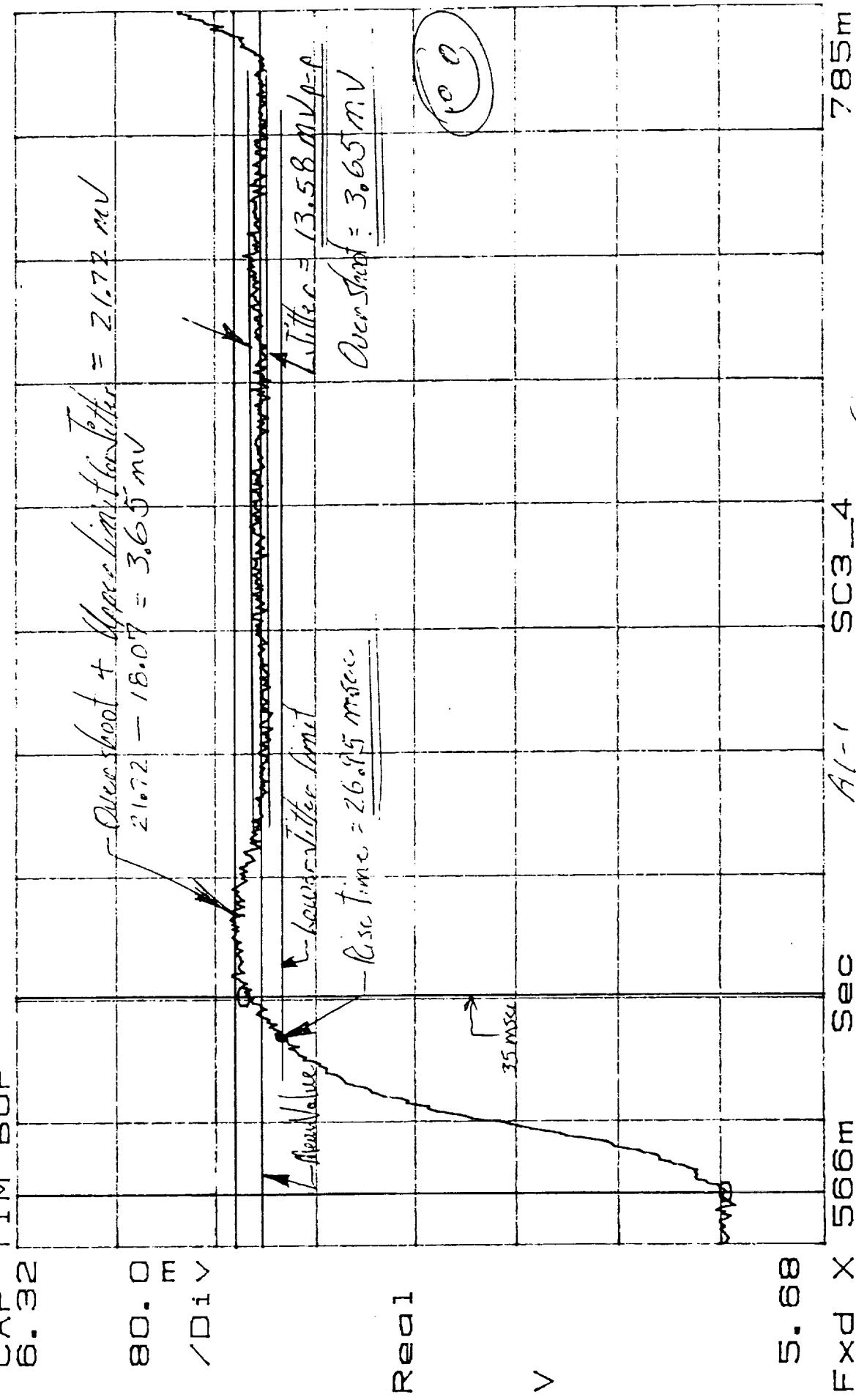
Test Eng'

Art 1-10 9/2  
Dmitri Slobodanovic 5/17/2021 5:41:17  
R14

$$X = 575.0 \text{ ms} \quad \Delta X = 35.16 \text{ ms} \quad Y = 6.14468 \quad \Delta Y = 381.1 \text{ mV}$$

CAP TIM BUF

$$X = 575.0 \text{ ms} \quad \Delta X = 35.16 \text{ ms} \quad Y = 6.14468 \quad \Delta Y = 21.72 \text{ mV}$$



Ref: 633170  
Ph: 1331720-2-17 Step: 107

Test Eng: 3.4.4.5

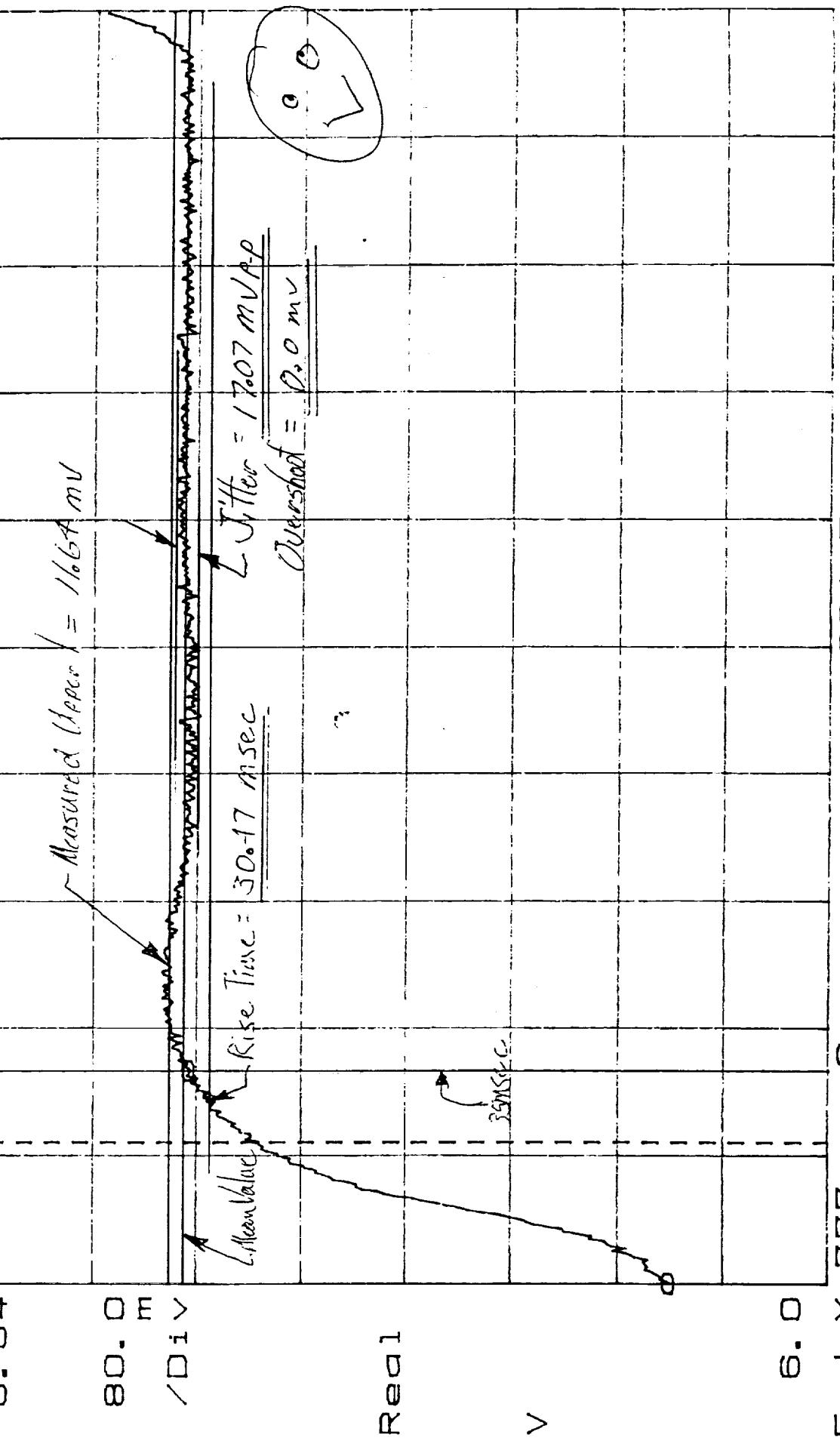
Test Eng: 3.4.4.5

Date: 2-20-03

Page: 29 of 29

X = 776.6ms  $\Delta X = 35.16\text{ms}$  Y = 6.50114  $\Delta Y = 11.64\text{mV}$

CAP TIM BU



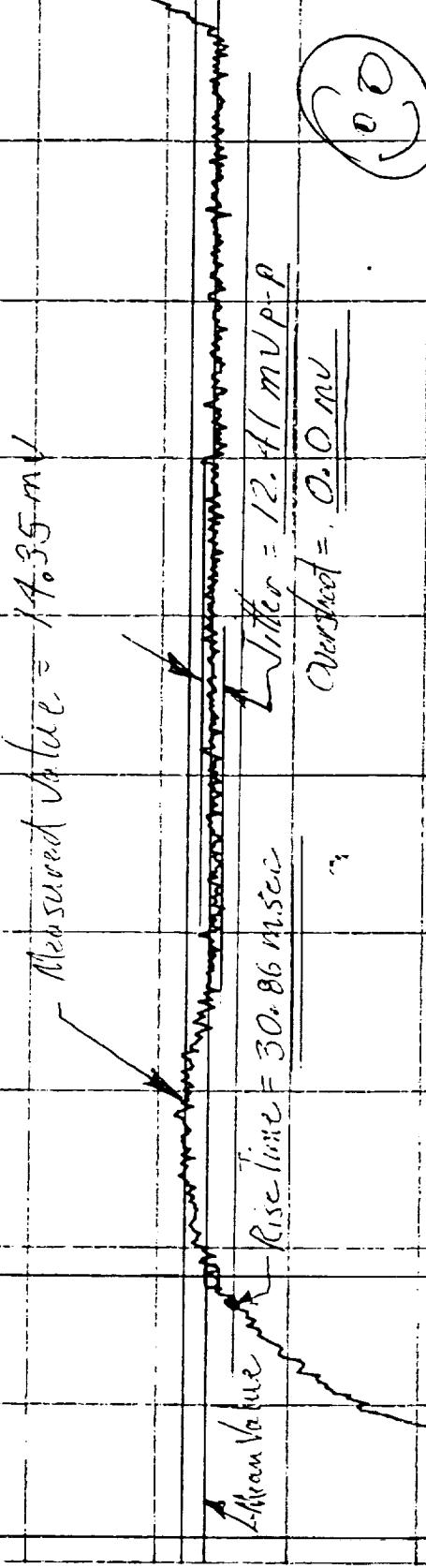
SB: 633/70  
P/N: 133172.2-2-17 Rev: 107  
Fxd X 777m Sec SC4\_5  
6.0 80.0 Test End. 3. Att  
987m Date: 10/21/99  
Qualit. ~~Pass~~ ~~Pass~~ B1  
Page 21 of 24

$X_a = 980.5 \text{ mS}$     $\Delta X = 35.16 \text{ mS}$     $Y = 6.86351$     $\Delta Y = 14.35 \text{ mV}$

CAP TIM BUF

7.04

80.0  
mV



Real

V

Fixd X 977 m Sec A1-1 SC5-6

6.4

STO: 655120

3.4-1.5

Alt: 1331720-2-17 30:107

MEU  
8  
SET

Test Eng:

Print: 10/26/99  
Page: 10 of 10

P7

$$X = 1.182 \text{ S} \quad \Delta X = 35.16 \text{ mS}$$

$$Y_d = 6.84896 \quad \Delta Y_d = 37.1 \text{ mV}$$

CAP TIM BUF

7. 36

Measured Value = 17.84 mV

80. 0  
/ Di v

Real

Mean Value + 26.17 msec

$J_{Titter} = 3.146 \text{ mV sec}$

OverShot = 0.0 mV

(C)

V

6. 72

F x D X 1. 18 Sec A/-1

5/6: 633/70

Phi: 153/720-2 int SW: 107

SC6-7

Test Eng:

AM-100

Qualit.

1. 39

Date: 1. 21 - 19

Signature

17.9

X=1.385 S  $\Delta X=35.16 \text{mS}$   $\Delta Y_d=373.0 \text{mV}$

Y=7.21225  $\Delta Y=18.23 \text{mV}$

CAP TIN BUF

7. 84

80. 0  
m  
v  
D i

$$\sqrt{\Delta p_{init} + \Delta overshoot} = \sqrt{18.23 + 18.07} = 16 \text{ mV}$$

Real  
Sec

Mean Value  
Rise Time = 27.73 msec

$$Jitter = 13.19 \text{ mV e-0}$$

$$Overshoot = 16 \text{ mV}$$

v

35 msec

7. 2

Fixd X 1. 38

Sec

SC7-8

1. 6

5/10: 6531710

3.1.1.5

Test End:

AMSU  
8  
SLT

Date: 1-21-96

9/11: 1351720-2-17 Sec: 107

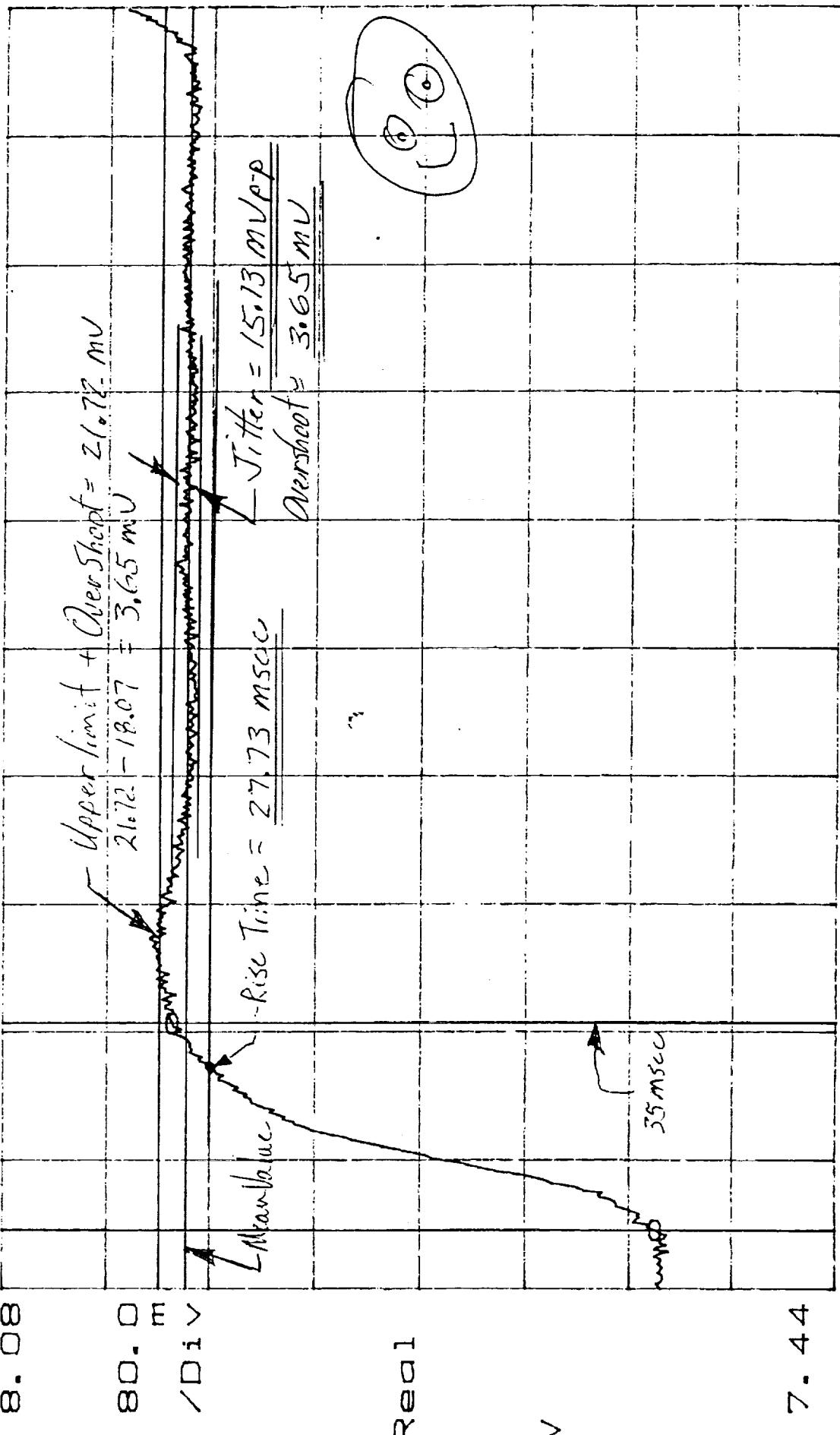
Chart

JUN 21 '96

P.F.

$X = 1.588 \text{ S}$   $\Delta X = 35.16 \text{ mS}$   $Y = 7.95937$   $\Delta Y = 21.72 \text{ mV}$

CAP TIM BUF



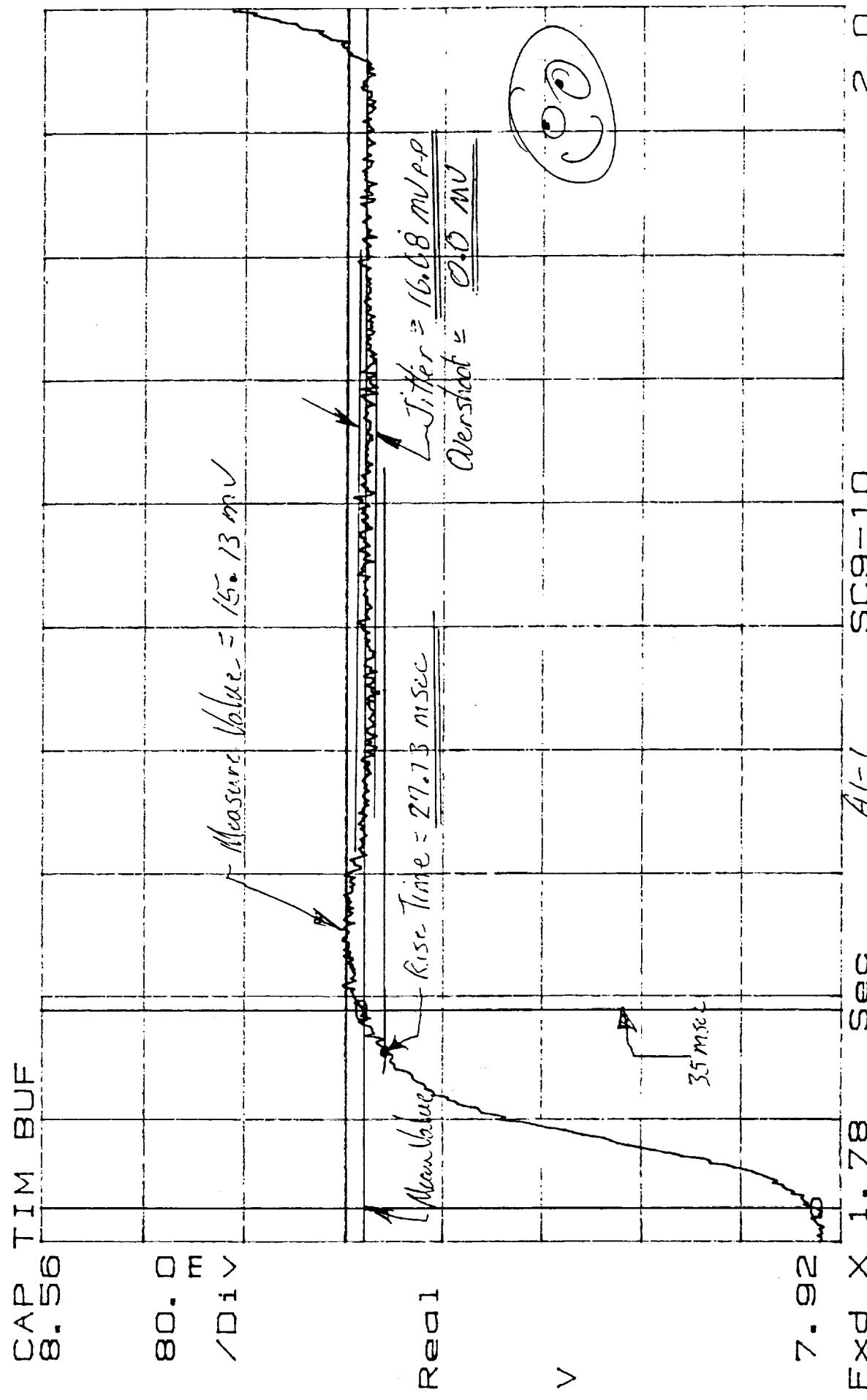
Fwd X 1.58 Sec 2/1-1  
5/0' 653.20  
No: 133720-2-1T. Rev: 107

1.8  
Test Eng:  AMM  
 SEAT  
Printed:

Date: 1/26/99  
Page: 1/21/99  
F11.

$X_d = 7.79$  S  $\Delta X = 35.16 \text{ mS}$   $\Delta Y_d = 366.5 \text{ mV}$

$Y = 8.31835$   $\Delta Y = 15.13 \text{ mV}$



S/N: 133177-2-17 SN: 107  
Fwd X 1.78 Sec 5.4 t<sub>5</sub>

Fwd X 1.78 Sec 5.4 t<sub>5</sub>

Test Eng'

(ANSI B  
8  
S17)

2.0

Date: 1-21-93  
JW 21 93  
DRAFT

RH

$X_d = 8.30212$   $\Delta X = 35.16 \text{ mS}$   $\Delta Y_d = 371.4 \text{ mV}$

$\gamma = 8.6814$

$\Delta \gamma = 17.84 \text{ mV}$

8. 24  
Fxd X 1. 99 Sec

Real

V

Measured Value = 17.84 mV

/ Div

Rise Time = 25.78 μsec

Man Value

35msec

no

5.1.45

SC10-11

2. 2

Test Eng.

Date: 1-21-99

No. 14

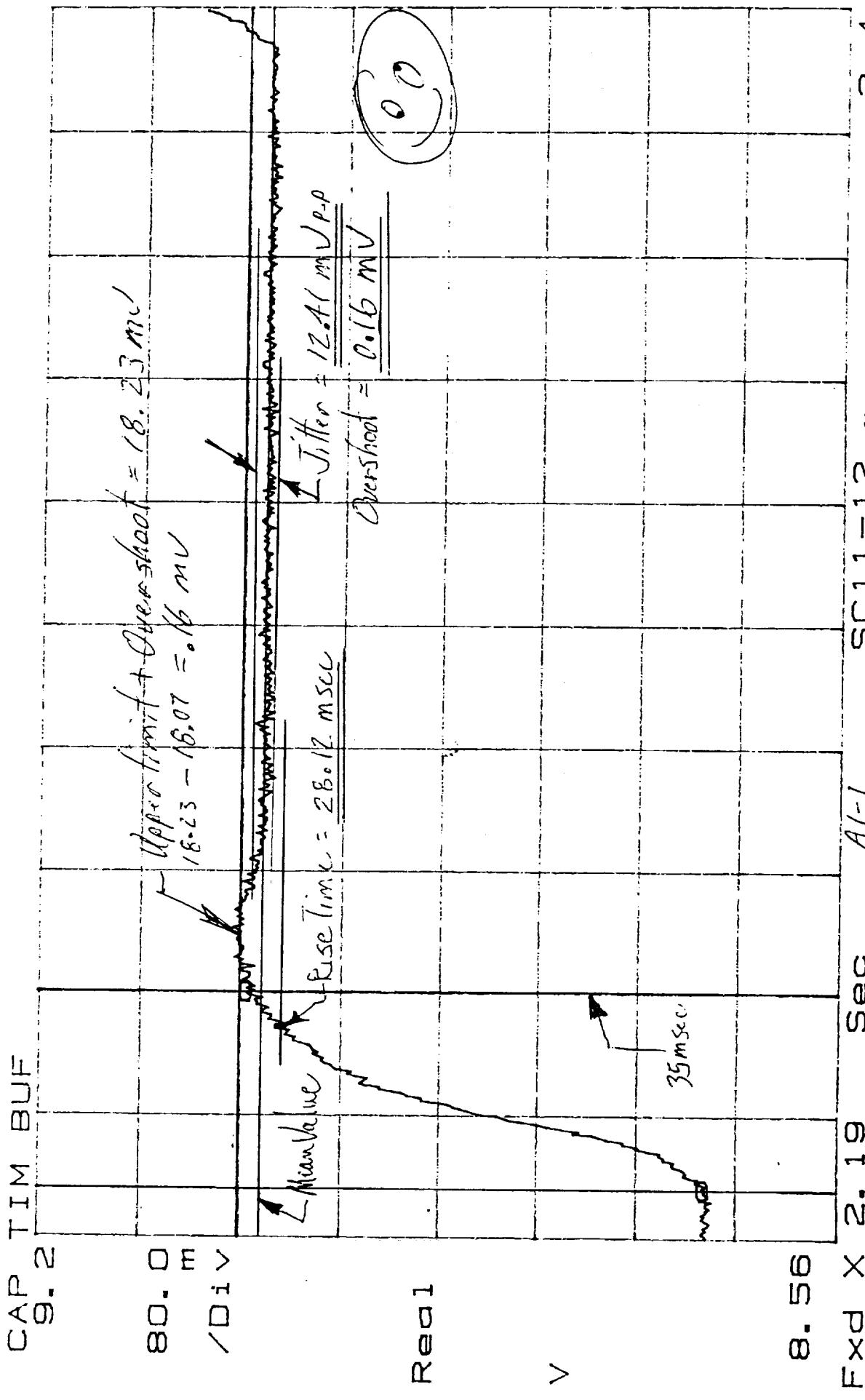
Fig: 1331720-2-17 S/N: 107

Scal: 633170

$$X_a = 2.195 \text{ S} \quad \Delta X = 35.16 \text{ mS}$$

$$\Delta Y_a = 36.9.8 \text{ mV}$$

$$Y=9. \quad \square 4097 \quad \Delta Y = 18.23 \text{ mV}$$



FxD X 2.19 Sec Al-1  
S/N: 633170 Date: 1-21-99  
PN: 1331720-2-1T SN: 107

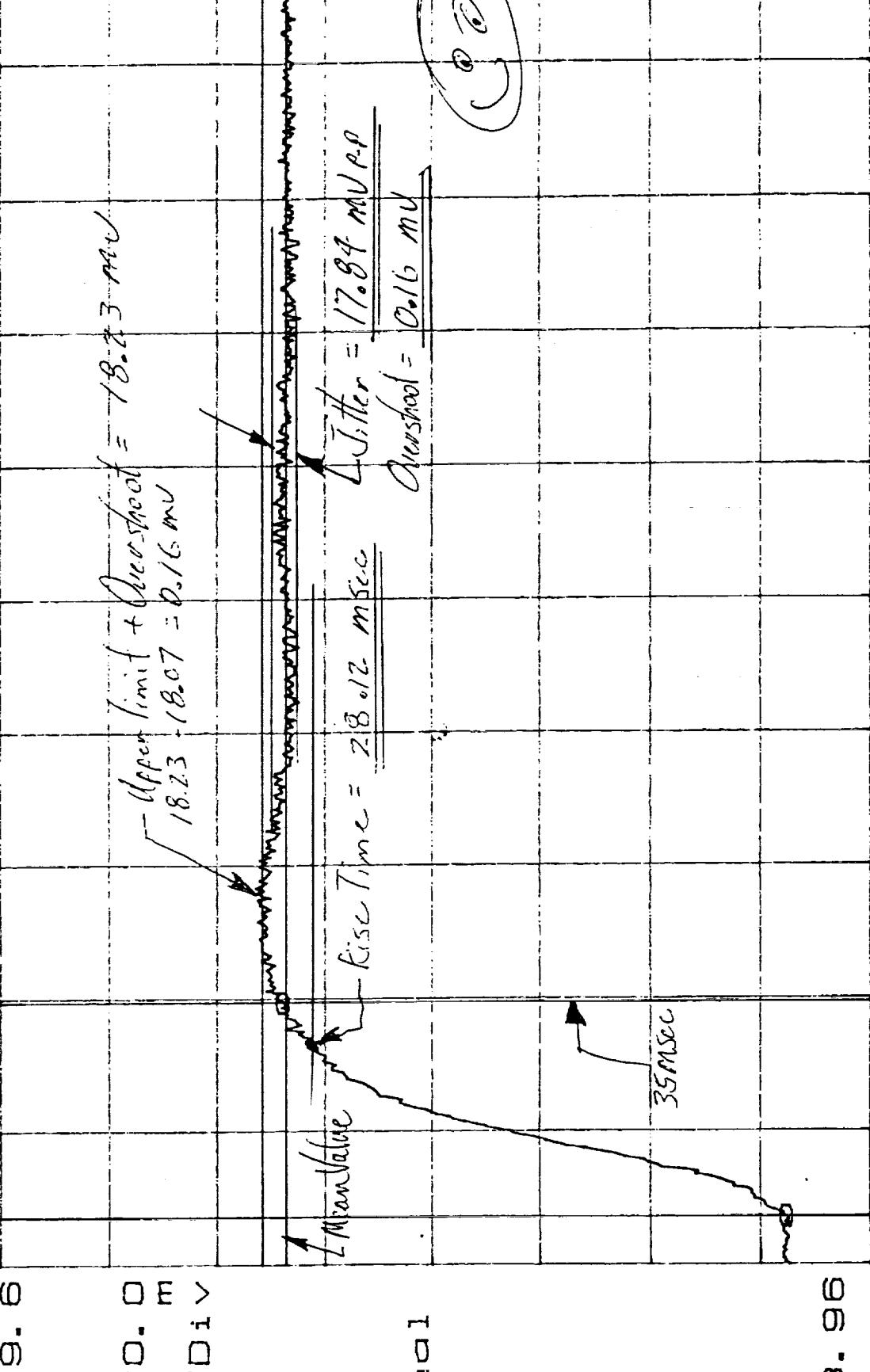
SC11-12 <sup>AUSU B RTR</sup>  
test Eng: 5.4.1.5

2. 4  
Date: 1-21-99

Qualif.

$X = 2.397 \text{ S}$   $\Delta X = 35.16 \text{ mS}$   $Y = 9.40606$   $\Delta Y = 18.23 \text{ mV}$

CAP TIM BUF



Fixed X 2.39 Sec 3.67.5 2.61  
Slope: 653.170 Test Eng.

PN: 1331720-2-17 50:107 Date: 1-21-97

Qualif.

AMSU

B

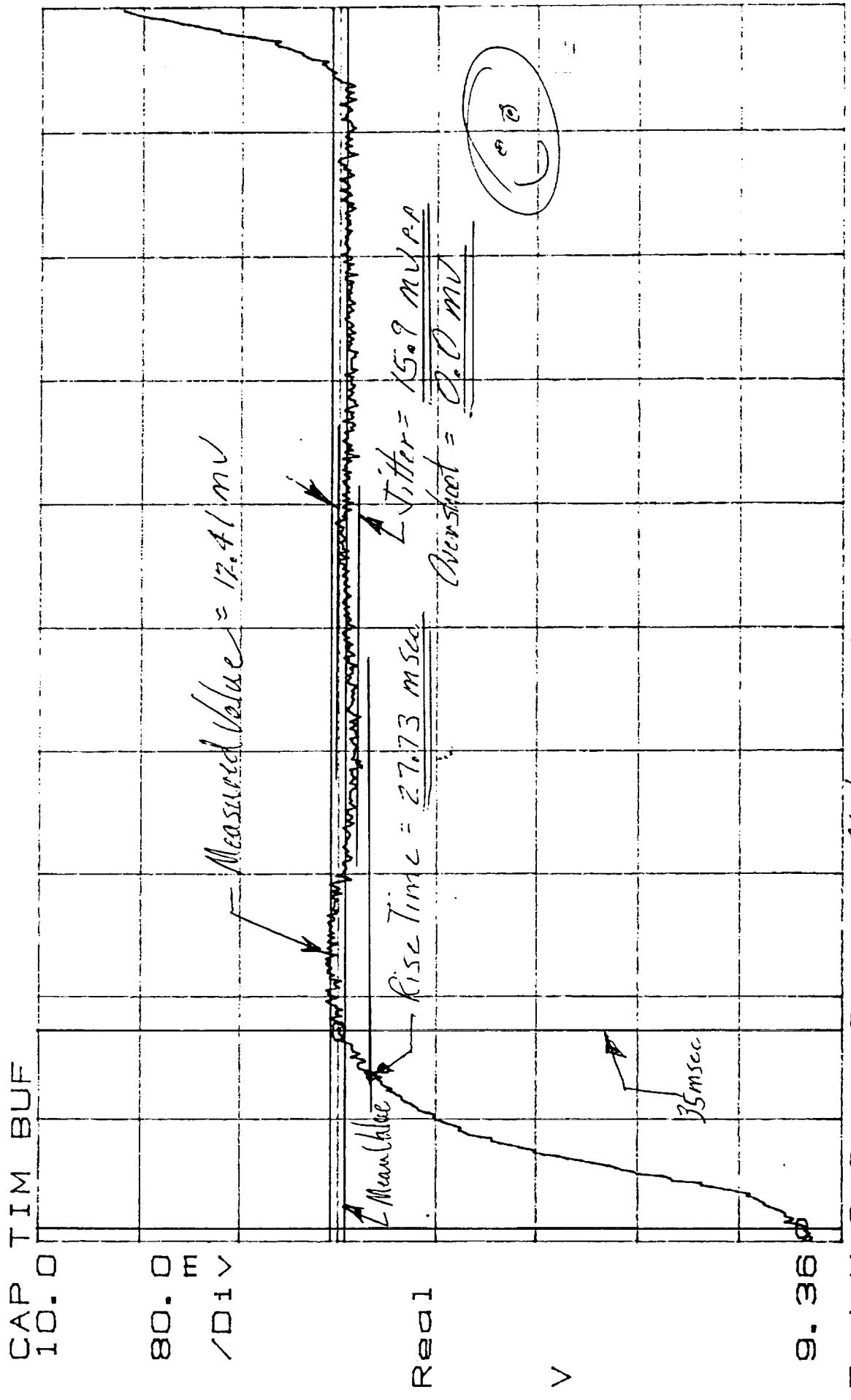
SEU

8

11/29/96

P14

$X = 2.6$  S  $\Delta X = 35.16 \text{ mS}$   $Y = 9.76572$   $\Delta Y = 12.41 \text{ mV}$



SC 13-14  
Sec 3.4.1.5  
Test Eng.  
Quality

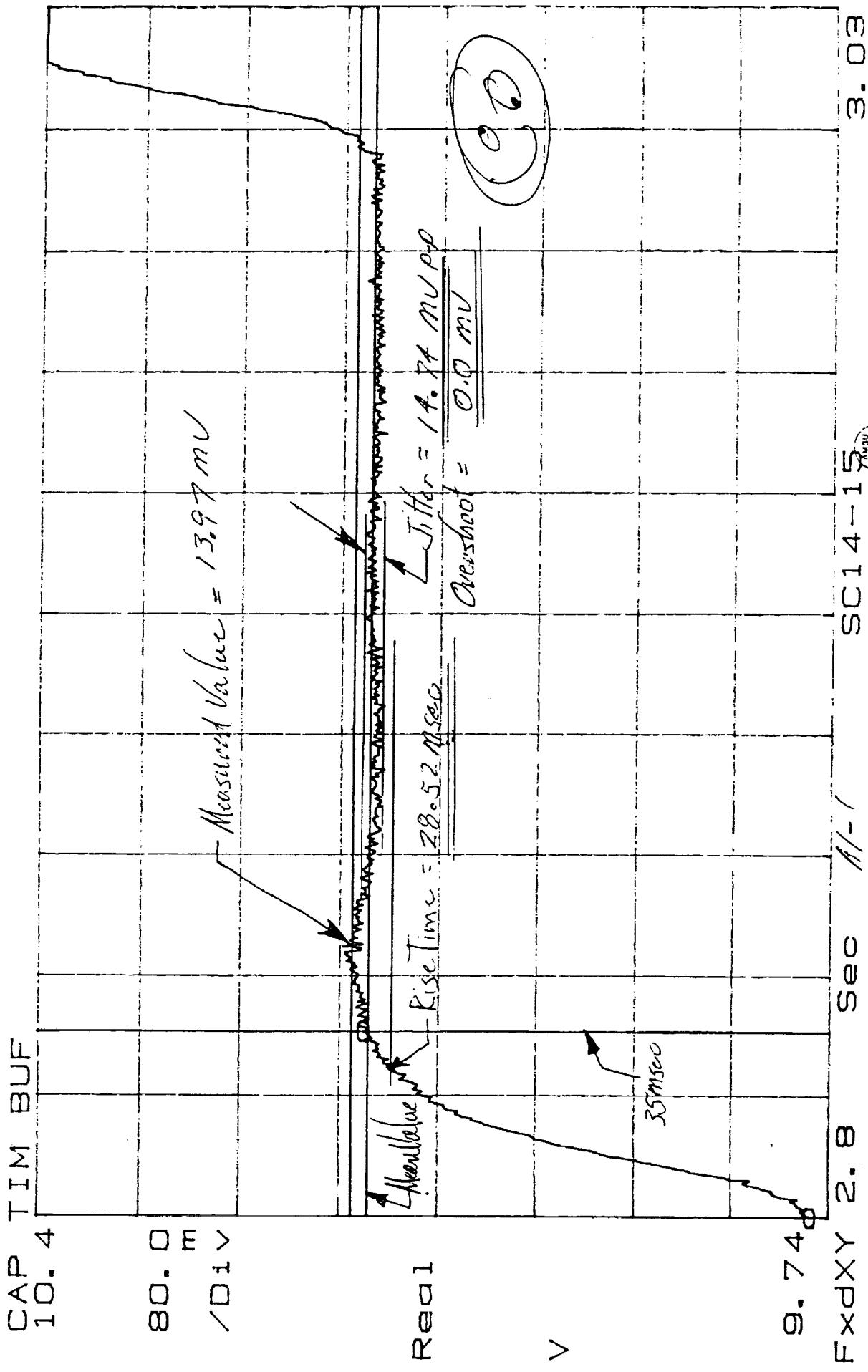
S/N: 633170  
S/N: 1331720-2-1T SN: 107

Date: 1-21-99

AMU ETT

116

$$X_a = 2.804 \text{ S} \quad \Delta X = 35.16 \text{ mS} \quad Y_a = 9.75852 \quad \Delta Y_a = 364.9 \text{ mV}$$



St: 633170  
PN: 1331720-11 SW: 102

5.4K5

SC14-1

3.03

Test Eng: John  
Quality: Good

Date: 1/21/97

Page: 11

$X_a = 3.01$  S  $\Delta X = 35.16 \text{mS}$   $Y = 10.4945$   $\Delta Y = 16.49 \text{mV}$

CAP TIM BUF  
10.8

100  
m  
Div

Real

V

10.0

Fwd X 3.01

Sec

Alt-1

SC15-16

100

Measured value = 16.9 mV

Max Up = 23.05 msec

Max Down = 35 msec

Set time = 16.0 msec

Overshoot = 2.0 mV

(c) g

5/6/1970 11:17 AM

Sh. 102

3.22

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

Date: 5/6/1970  
Test Eng: 8  
1150 SETT  
Qualif. OK

115

$$X = 3.207 \text{ S} \quad \Delta X = 35.16 \text{ mS}$$

$$Y = 10.4786 \quad \Delta Y = 358.4 \text{ mV}$$

$$\Delta Y = 22.3 \text{ mV}$$

CAP TIM BUF

11.

100  
m  
v

Real

V

10.3

Fxd X 3.21 Sec

SC16-17 <sup>(MSU)</sup>  
Test Eng. (ET)

3.42  
S/N: 633170  
PH: 133/720-2-11 SW: 107

Initial & transient

Final

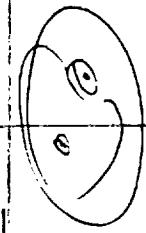
$$\frac{\text{Upper limit} + \text{Overshoot}}{22.3 - 18.07} = 22.5 \text{ mV}$$

And

$$\text{Peak Value} \quad \text{Rise Time} = 27.31 \text{ msec}$$

$$\text{Jitter} = 16.97 \text{ mV p-p}$$

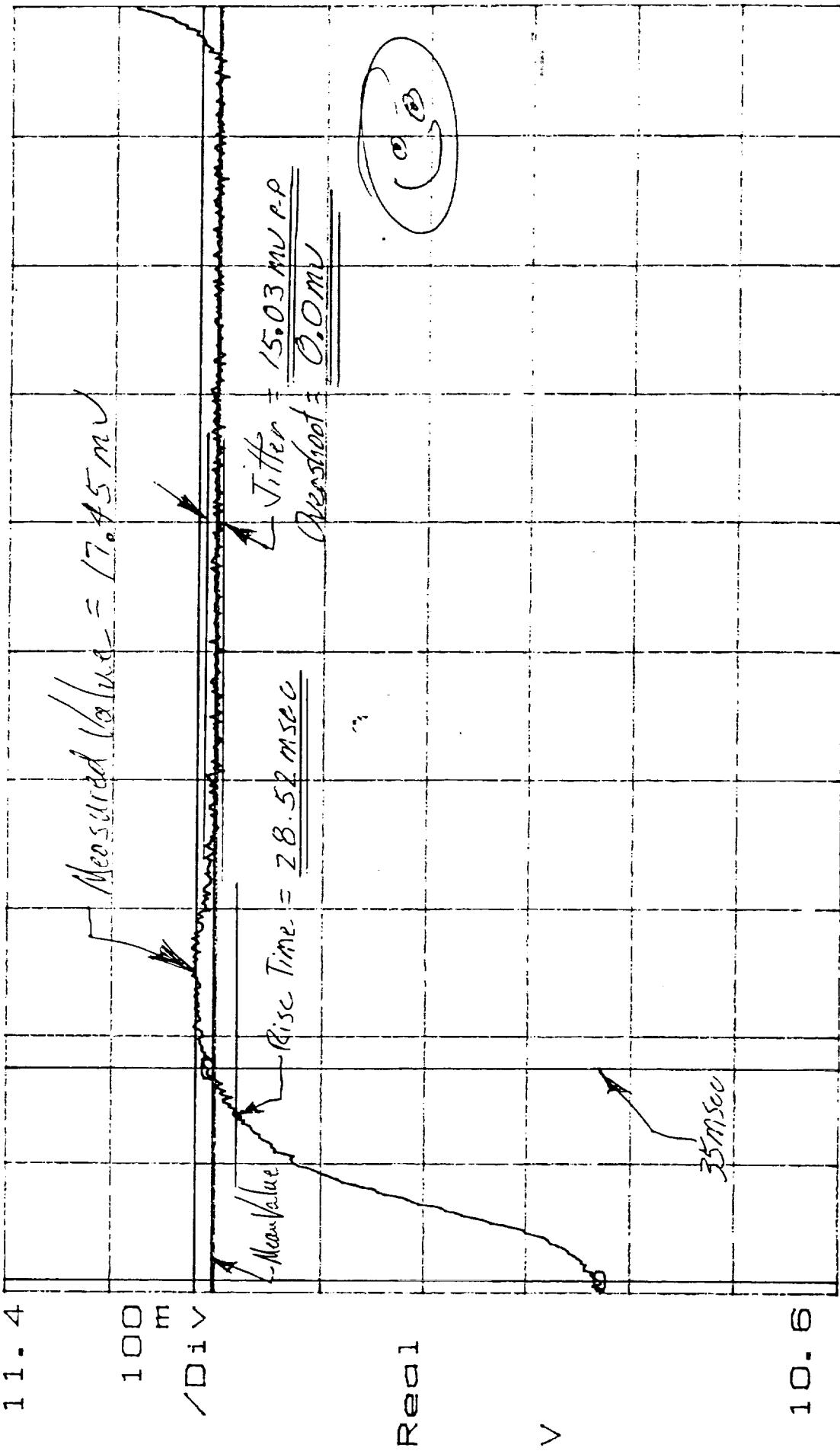
$$\text{Overshoot} = 4.23 \text{ mV}$$



35 msec

$X = 3.41$   $S = 10.8273$   $\Delta X = 35.16 \text{ ms}$   $\Delta Y = 379.5 \text{ mV}$   $Y = 11.2191$   $\Delta Y = 17.45 \text{ mV}$

CAP TIM BUF



Fwd: 633170  
Rev: 1331720-2-17 SW: 102

SC17-18 (8)  
Test Eng: 5. A. K. S.

3. 62  
Date: 1-21-99

Qualif: ~~Good~~

$X_d = 3.813 \text{ S}$     $\Delta X = 35.16 \text{ mS}$     $Y_d = 11.2036$     $\Delta Y_d = 371.4 \text{ mV}$

CAP TIM BUF  
11.9

100  
m  
v

Measured value = 160.97 mV

Real

Measured Rise time = 28.52 msec

Rise time = 170.15 mV/m

Overshoot = 0.0 mV

0  
0

v

11.1

Fixd X 3.61 Sec

3.4.4.5

SC18-19

AM50  
B  
BEST

3.83

Date: 1-21-99

P/N: 1331720-2.17 50U107

Charfitter

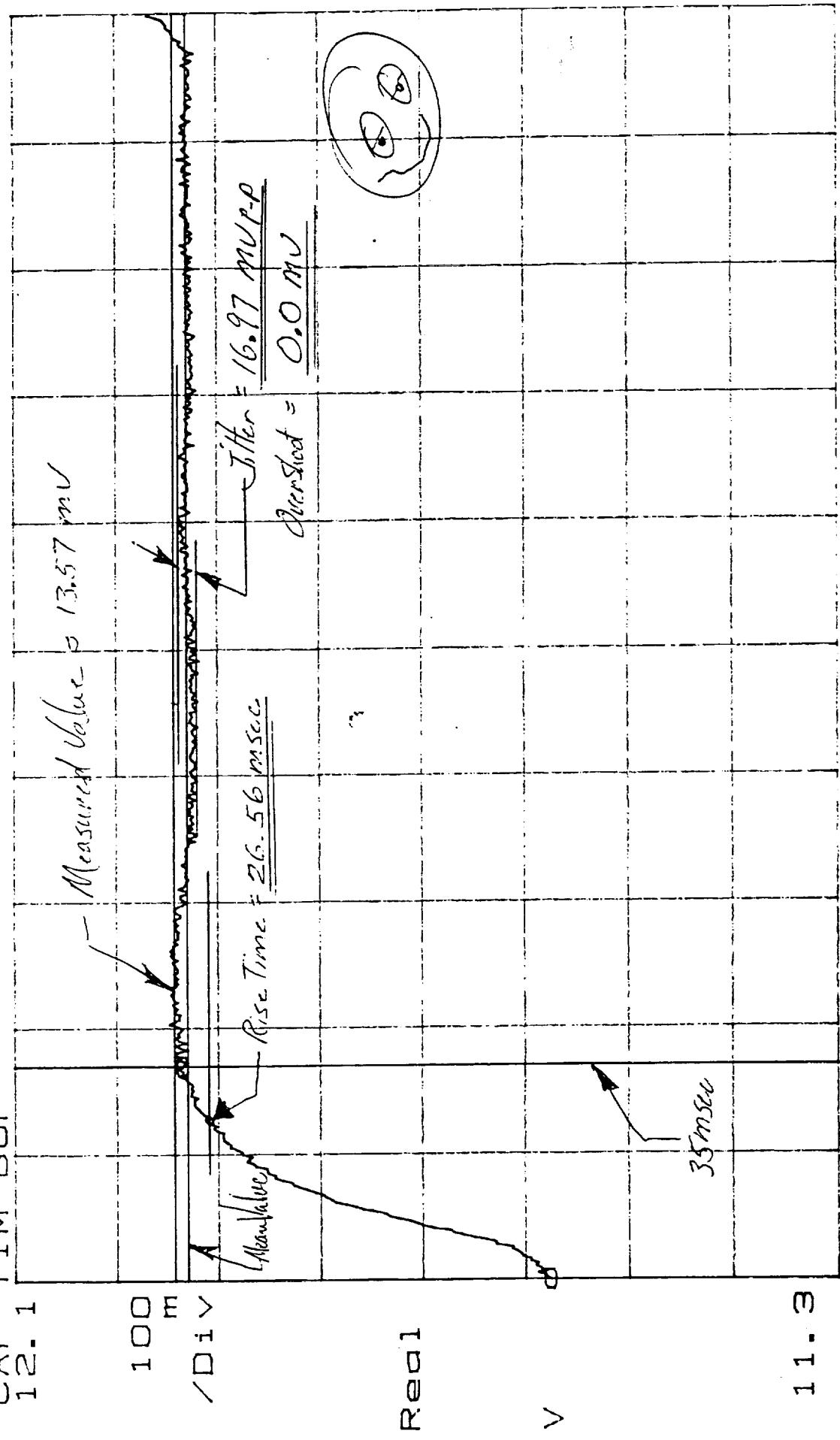
111

$\Delta Y = 13.57 \text{ mV}$

$Y = 11.9434$

$X_o = 3.816.16 \text{ mS}$      $\Delta X = 35.16 \text{ mS}$   
 $CAP TIM BUF$

12.1



SC19-20  
Sec A/-1  
3.1.4.5  
FxD X 3.82  
S/N: 633/10  
P/N: 1331720-2-17 SN: 107

AMSV  
8 sec  
Test Eng'

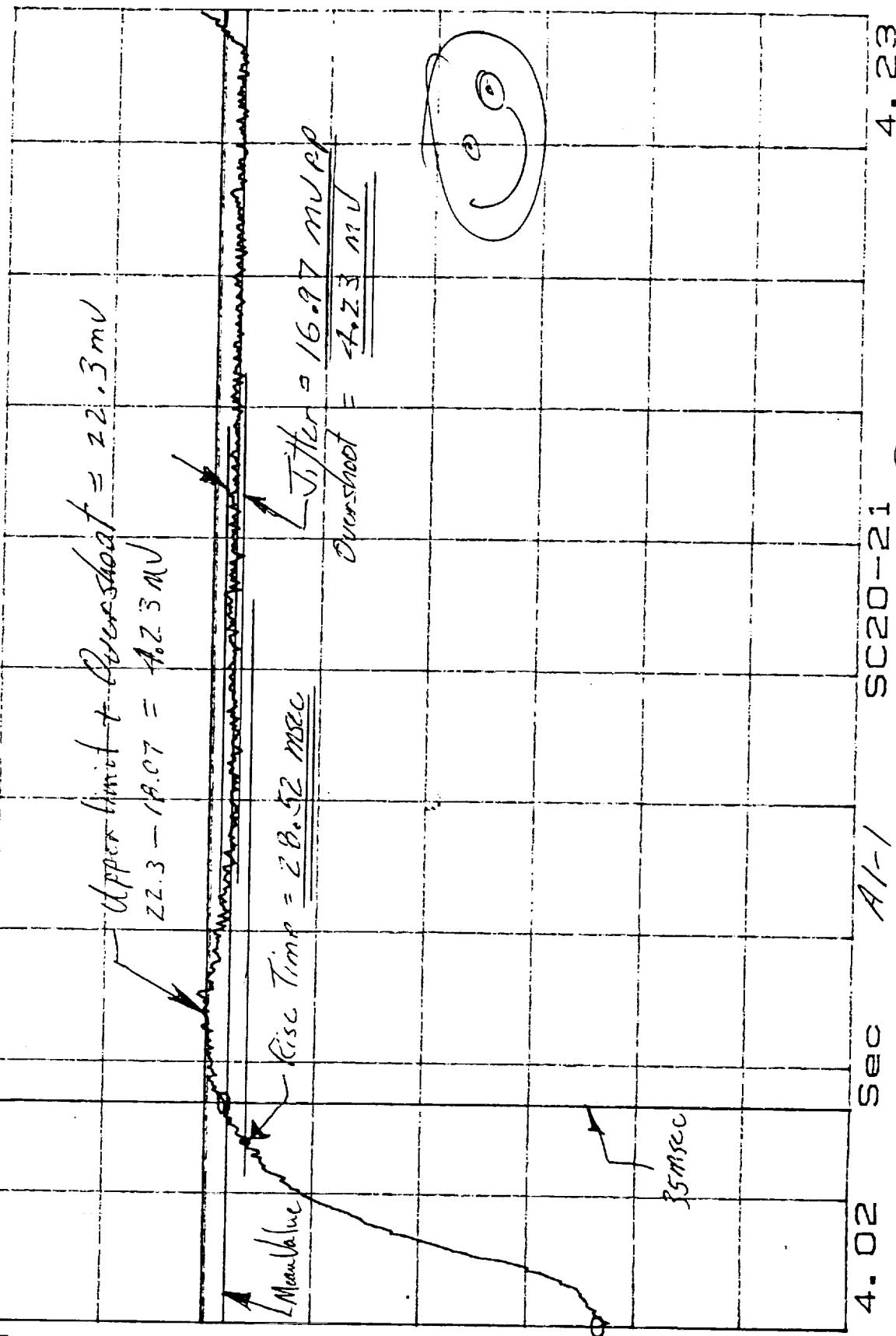
4.02  
Date: 1-21-99  
Qual. ~~Pass~~ ~~Pass~~ ~~Pass~~ ~~Pass~~

P/N: 1331720-2-17 SN: 107

Page 1 of 1

$X = 4.017 \text{ S}$     $\Delta X = 35.16 \text{ ms}$   
 $Y = 11.9318$     $\Delta Y = 35.1.9 \text{ mV}$   
 CAP TIM BUF  
 12.5

$\Delta Y = 22.3031$     $\Delta Y = 22.3 \text{ mV}$



11.7  
 Fxd X 4.02 Sec  
 96.633/170

J. # 1.5

SC20-21

4.23

Test Eng: AMU B  
 Date: 1-21-95

Phi: 133.1720 ± 1° SW: 107

Quality: Good

Page: 1

$X_d = 12.2853$   $\Delta X_d = 35.16\text{mS}$   $Y = 12.6391$   $\Delta Y = 15.03\text{mV}$

CAP TIM BUF  
12.9

100  
m  
/D1 V

Measured Value = 15.03 mV

Real  
Sec

Rise Time = 26.17 msec

Jitter = 12.61 msec

Overshoot = 0.0 mV

100

35 msec

12.1

Fixd X: 4.22

Sec

SC21-22

4.43

5/15/5

Test End:

Date: 1-21-97

Page 2

Ph: 1331720-2-1T 5/1/107

Pulse

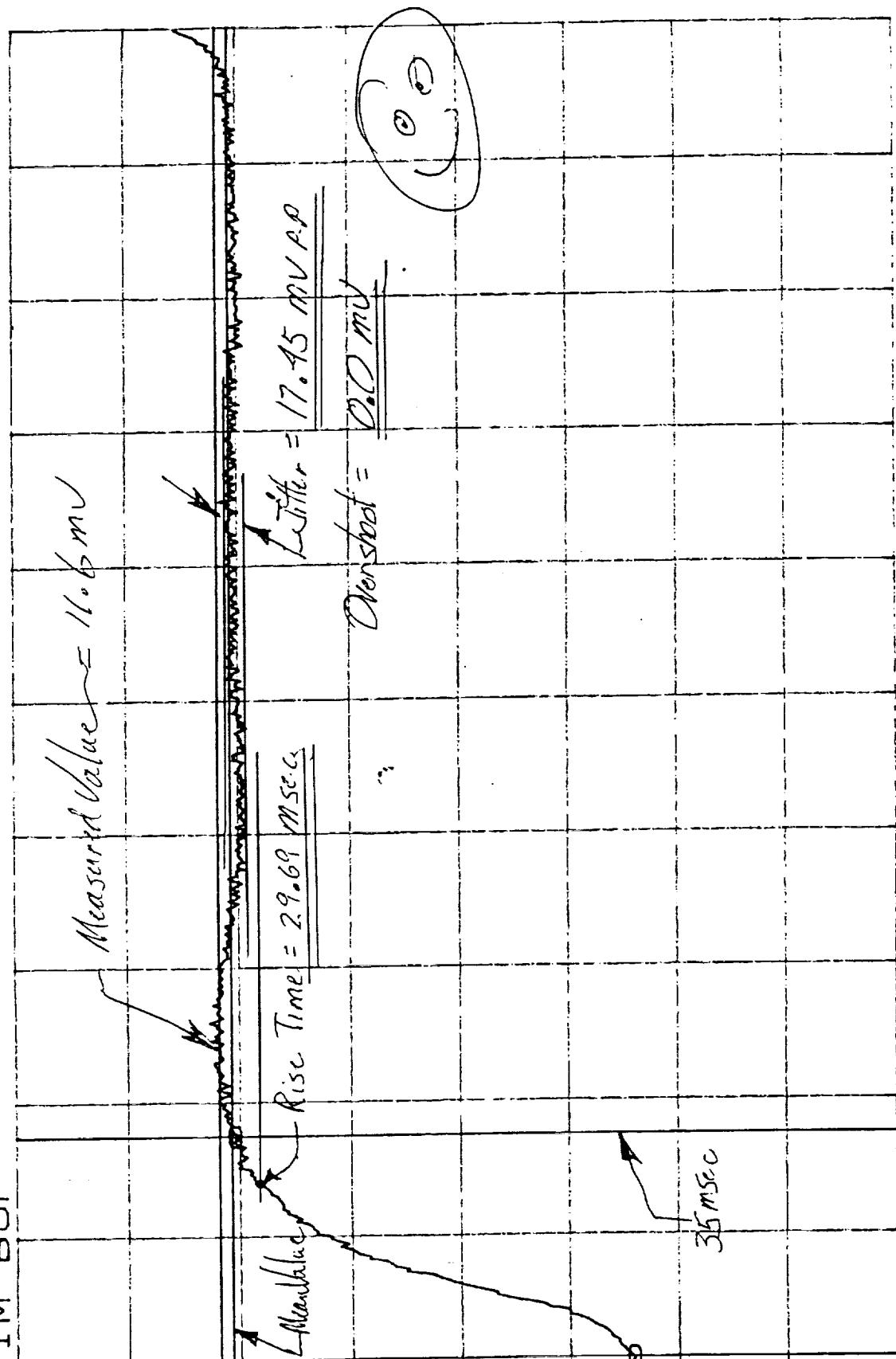
$X = 4.423 \text{ S}$     $\Delta X = 35.16 \text{ mS}$     $Y = 13.0187$     $\Delta Y = 11.64 \text{ mV}$

CAP TIM BUF  
13.2

100  
m  
Div

Real

V



Fixd X 4.42 Sec 5.11.5

5/6: 133/720-2-1T 5.11.107

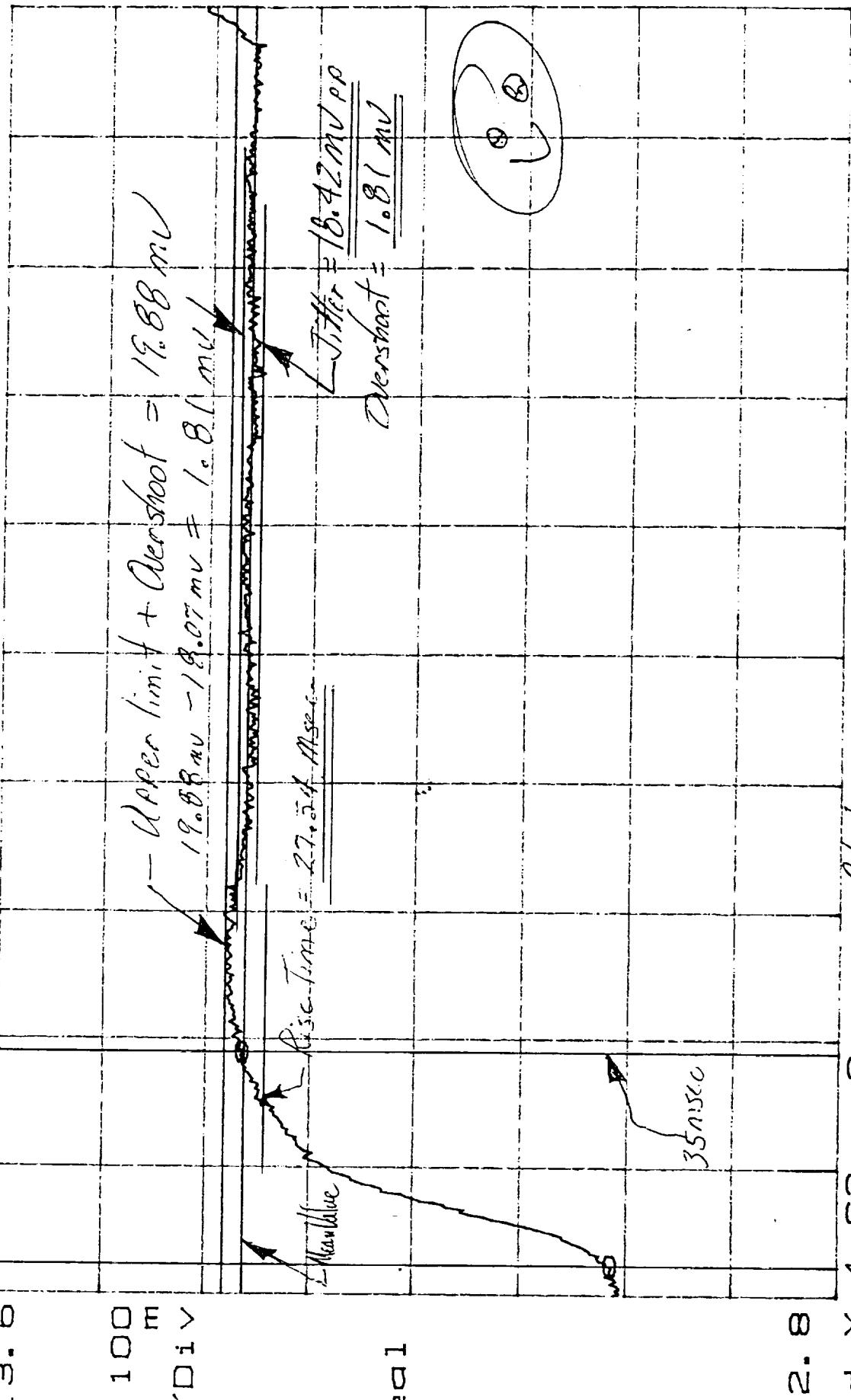
4. 63  
SC22-23  
AMSU  
B  
SEIT  
Test Eng.

Qualit. Test  
Date: 133/720-2-1T 5.11.107

$X_d = 4.628$  S  $\Delta X_d = 35.16 \text{ mS}$

CAP TIM BUF  
13.6

$Y = 13.3818$   $\Delta Y = 19.88 \text{ mV}$



F x d X 4.62 Sec 3.4.4.5  
56: 633/170

SC23-24 AM5U 8  
Test Eng: 4.83  
Date: 1-21-96

Ph: 133/720-2-17 5A: 107

Qualtrac  
Jan 21 96

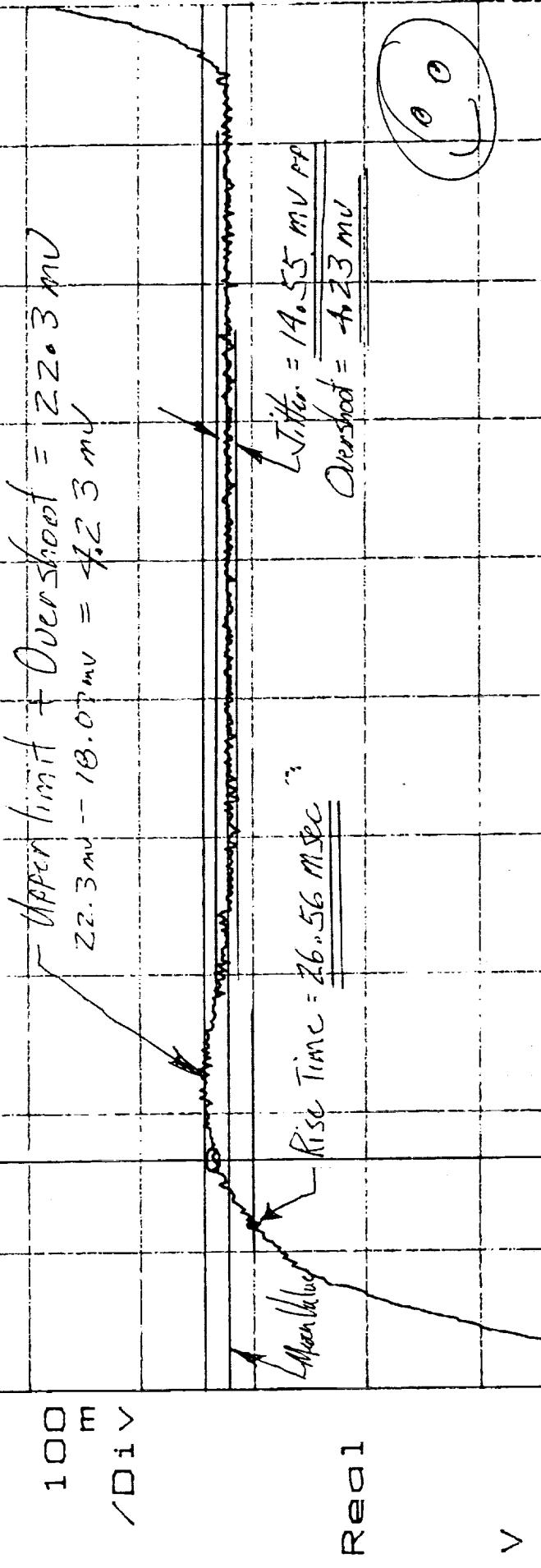
$$X = 4.829 \text{ S} \quad \Delta X = 35.16 \text{ mS}$$

$$Y = 1.3655 \text{ V}$$

CAP TIM BUF

14.0

100  
m  
V



Res 1

V

$$X = 4.829 \text{ S} \quad \Delta X = 35.16 \text{ mS}$$

$$Y = 1.3655 \text{ V}$$

CAP TIM BUF

14.0

100  
m  
V

13.2  
FxD X 4.83 Sec  
5/10 633110

3.4 x 10^-3

SC24-25

AMSR  
SEIT

5.04

Date: 1-21-89

NU: 133110-2-17 SW: 107

Qualit. ~~Good~~

11

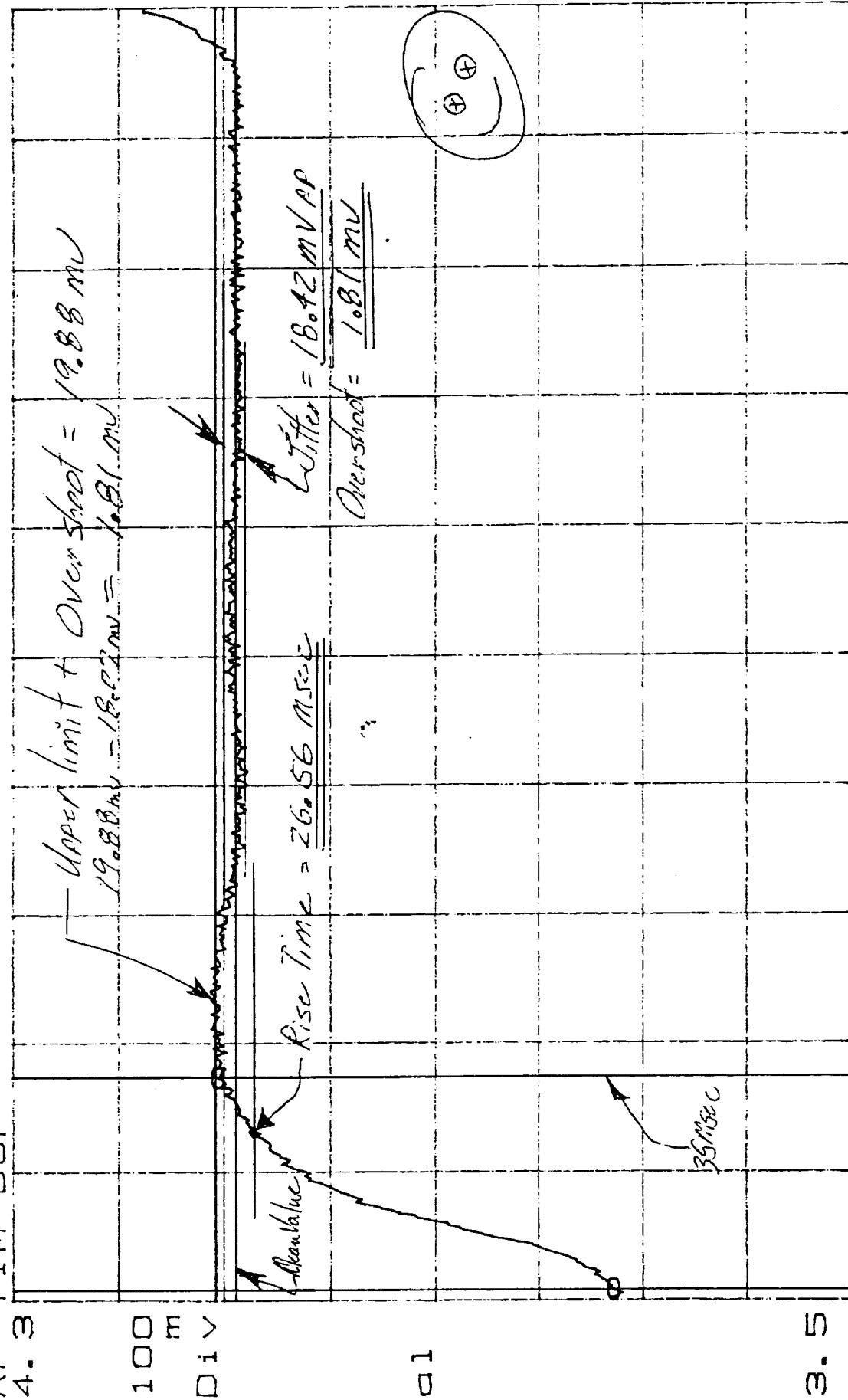
$X = 5.031.3.7271$   $\Delta X = 35.16 \text{ mS}$

$Y = 14.108$   $\Delta Y = 37.9 \text{ mV}$

CAP TIM BUF  
14.3

$\Delta Y = 19.88 \text{ mV}$

$\Delta Y = 14.108$



5. 24

SC25-26

Test End

Fixd X 5.03 Sec

13.5

16.633/120-2-17 50.107

Date: 1-21-99

ANSI B  
SEIT

Quality Control

File #

$X_0 = 5.234 \text{ S}$   $\Delta X = 35.16 \text{ mS}$   $Y = 14.4721$   $\Delta Y = 16.97 \text{ mV}$

CAP TIM BUF

14.7

100  
m  
v

Measured Value = 16.97 mV

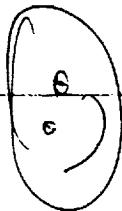
Disc Time = 27.73 msec

Montage

Real

v

Filter = 19.39 mV/μs  
Overshoot = 0.0 mV



13.9 Sec 3.445  
56' 633.170  
2/13/133/120-2-17 SW: 101

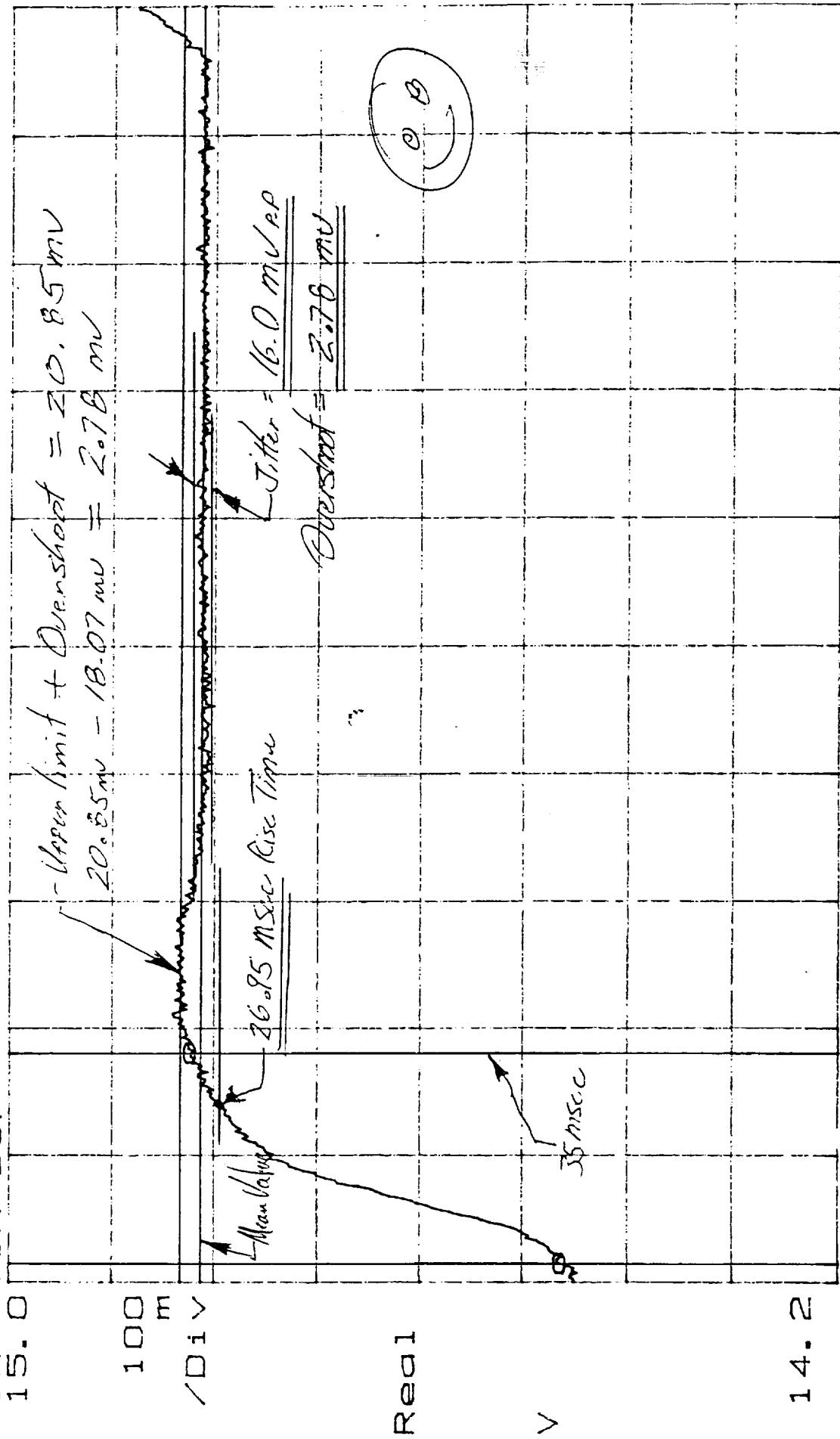
SC26-27  
Test Eng.  
5. 44  
Date: 1-21-99  
Quality: ~~Good~~ ~~Bad~~

Bk 1

$X = 5.436 \text{ S}$   $\Delta X = 35.16 \text{ mS}$   $Y = 14.8332$   $\Delta Y = 20.85 \text{ mV}$

CAP TIM BUF

$Y_d = 14.4634$   $\Delta Y_d = 360.0 \text{ mV}$



SC27-28 (AMSU  
Test Eng: 3.445  
5.65  
Date 1-21-99

PN: 133/120-2-17 SW: 107

Jan 21 1999

$X = 5.637$   $S_4$   $\Delta X = 35.16 \text{ mS}$   
 $Y = 14.815$   $S_4$   $\Delta Y = 36.3.3 \text{ mV}$

$Y = 15.191$

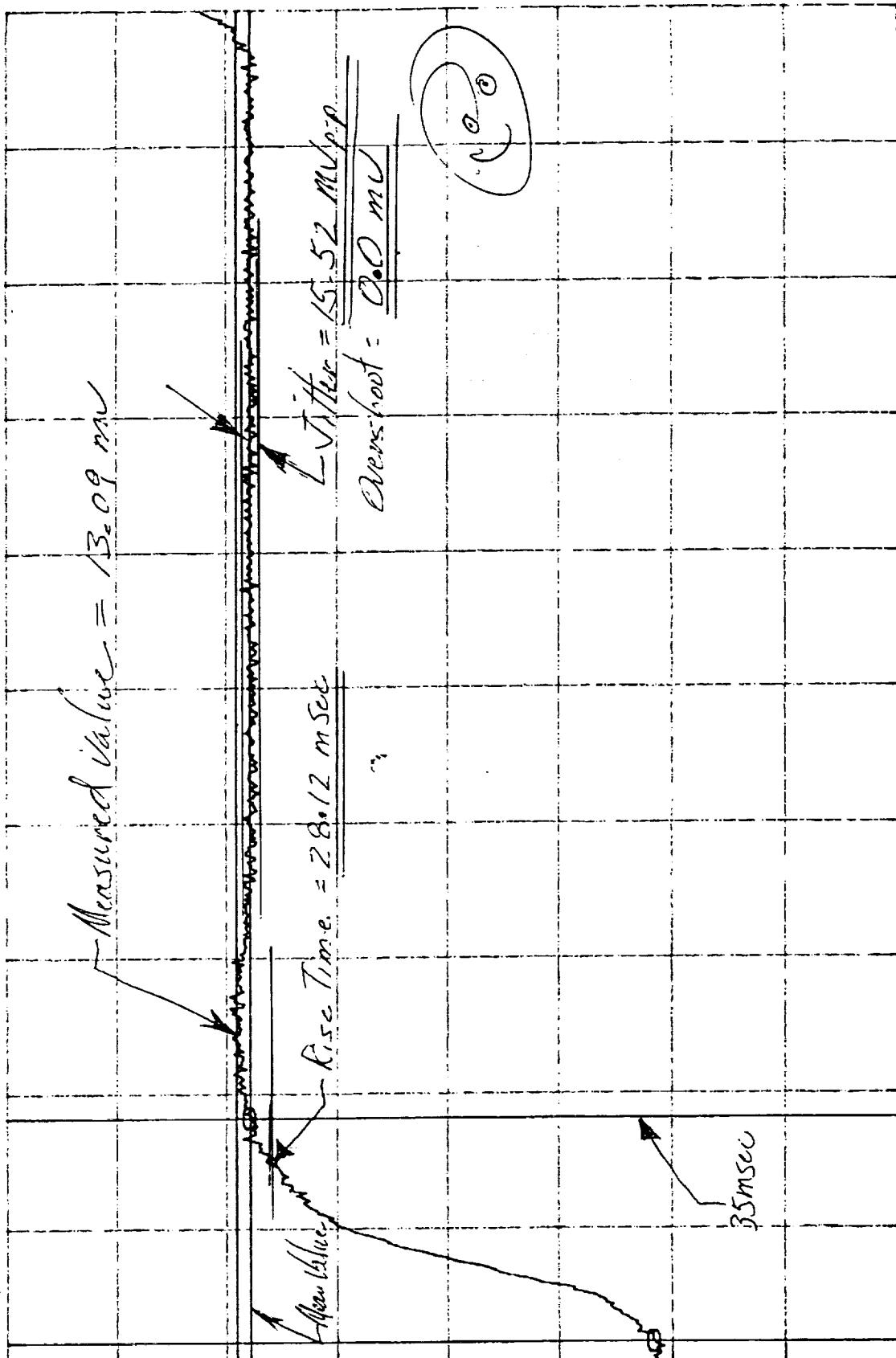
$\Delta Y = 13.09 \text{ mV}$

CAP TIM BUF  
15. 4

100  
m  
Div

Real

V



5. 85  
SC28-29  
Test Eng:  Self  
Quality:   
Ref: 1351720-2-17 Rev: 07  
Date: 11-11-94  
Page: 21/94

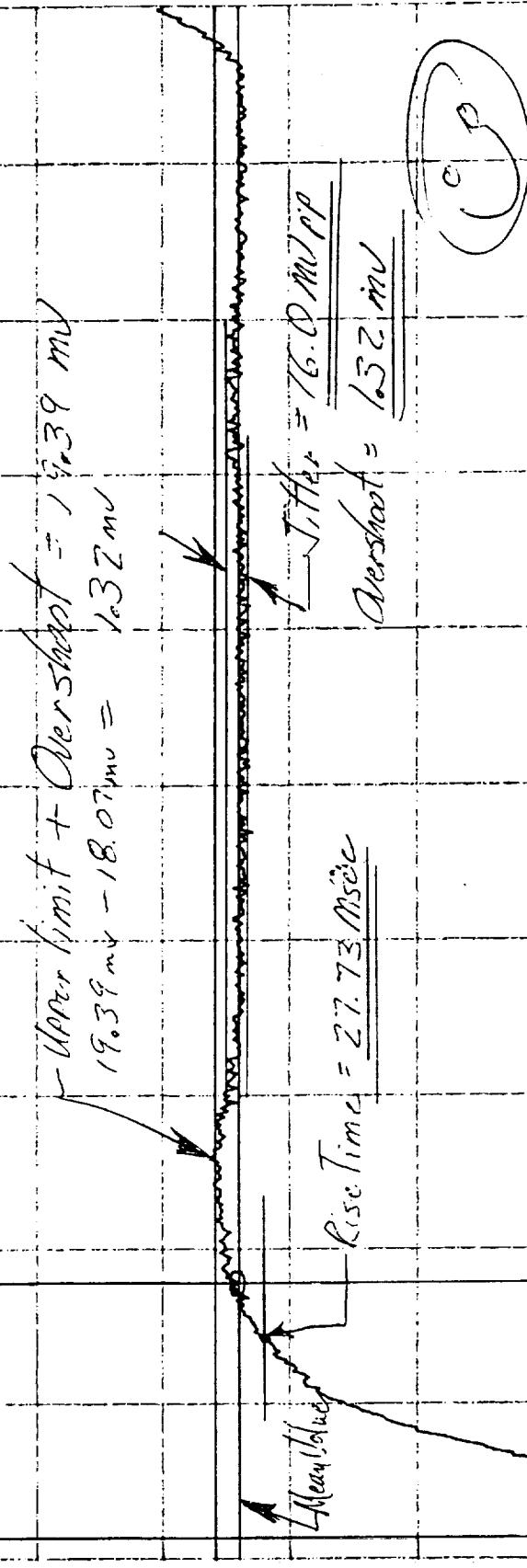
$X = 5.84$   $\Delta X = 35.16 \text{ mS}$   $Y = 15.5585$   $\Delta Y = 19.39 \text{ mV}$

CAP TIM BUF  
15.8

100  
m  
Div

Real

V

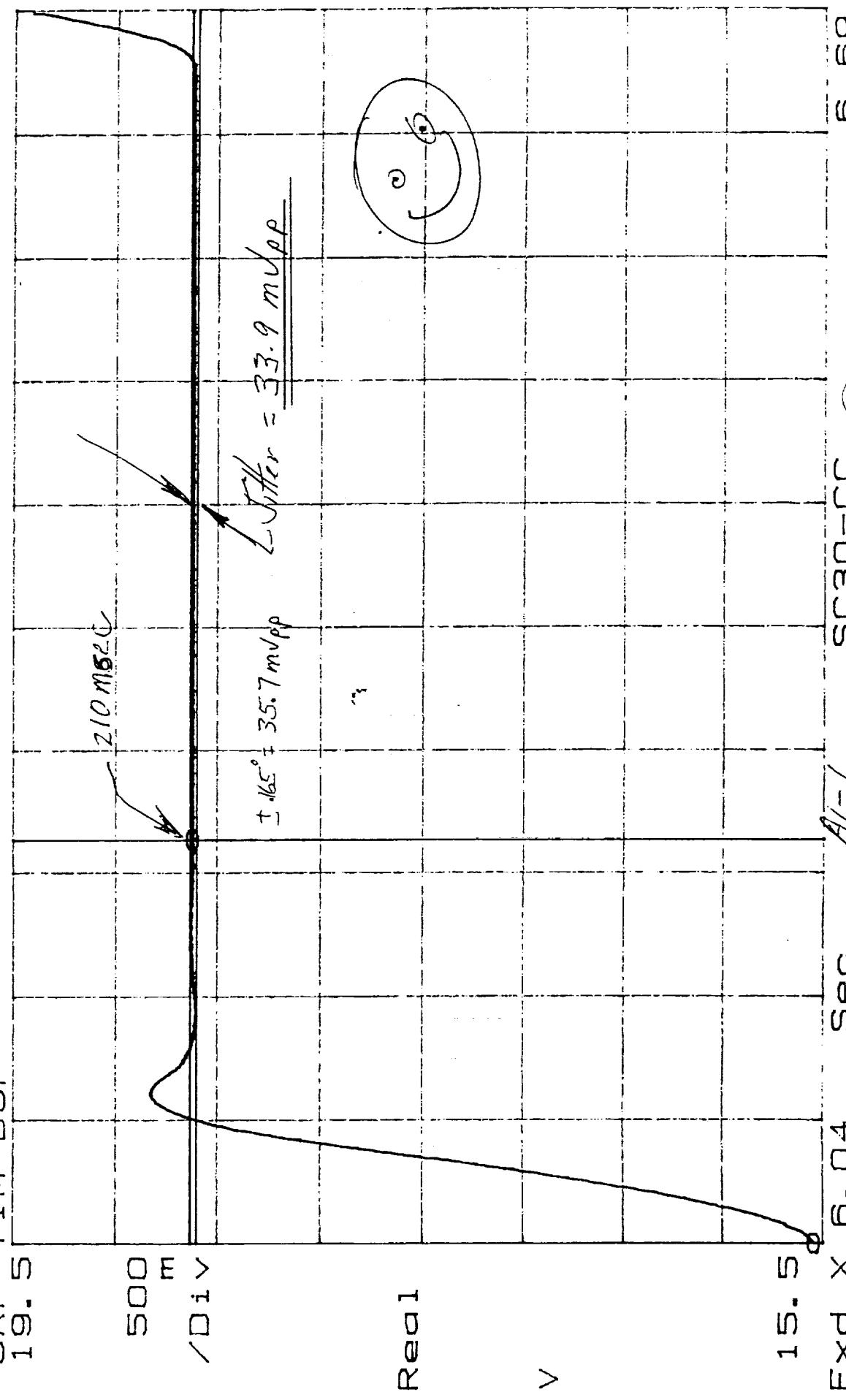


6.05  
6.05  
SC29-30  
A1-1  
5.44.5  
Test Eng.  
5/6/1984  
1533170  
PM: 1533170-17 301: 107  
Date: 1/23/2024 11:11:11  
Page: 1

$X = 6.044$  S     $\Delta X = 210.2^mS$   
 $Y = 15.5468$      $\Delta Y = 3.075^mV$   
CAP TIM BUF  
19.5

$Y = 18.6345$

$\Delta Y = 33.94^mV$



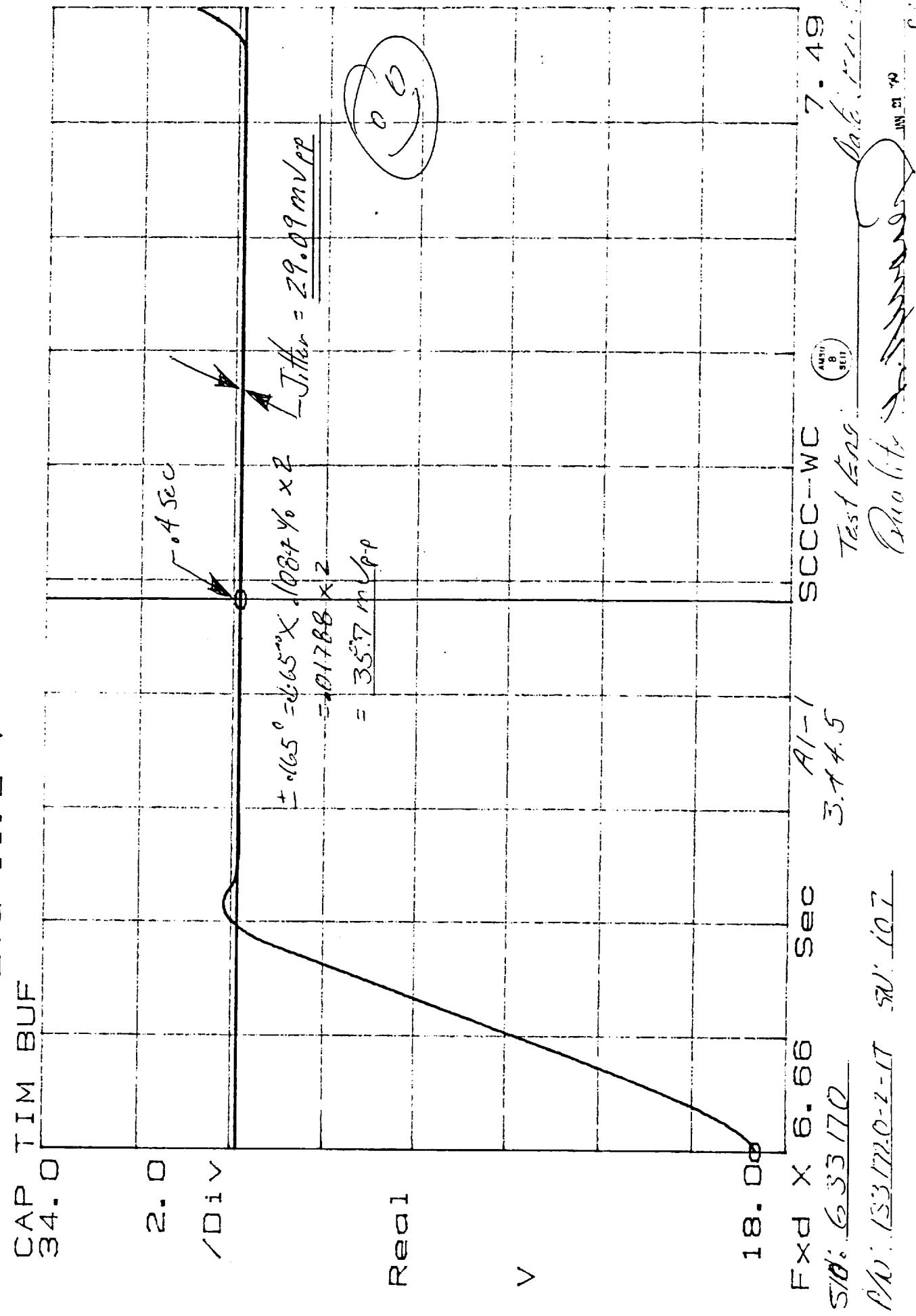
5/6: 633170 Date: 1-21-99  
PN: 1337211-2-1T Test Eng: 6. 69  
Qualif: *Pass*

AMBI B SET JUN 2 1999

$X = 6.664$  S       $\Delta X = 400.4 \text{ mS}$   
 $Y_o = 18.6591$        $\Delta Y_o = 11.2 \text{ mV}$   
 CAP TIM BUF  
 34.0

$Y = 29.8885$

$\Delta Y = 29.09 \text{ mV}$



# Time Capture

MEASURE:	CHAN 1	CHAN 2
	Power Spec	OFF
WINDOW:	CHAN 1	CHAN 2
	Hanning	Hanning
AVERAGE:	TYPE	OVERLAP
	Avg OFF	0%
FREQ:	CENTER	SPAN
	500 Hz	1.0 kHz
	REC LENGTH	BW
	800ms	1.87 Hz
	REC LENGTH	TIME
	Δt	AVG
	391 μs	OFF
TRIGGER:	TYPE	SLOPE
	External	Neg
	LEVEL	
	0.0 VPK	
INPUT:	RANGE	COUPLING
CH 1	31.7 VPK	DC Gnd
CH 2	AutoRng↑	DC Gnd
SOURCE:	TYPE	DELAY
	OFF	0.0 S
	LEVEL	OFFSET
	0.0 VPK	0.0 VPK
S/N:	3445-448 A1-2	Test Eng:
PN:	3445	Date: 1-21-99
		Qualif: <u>VA</u> <u>268</u> SN: 102

CAP TIM BUF

36.0

$$R_{58} = 20K$$

$$R_{19} = 118K$$

4.5

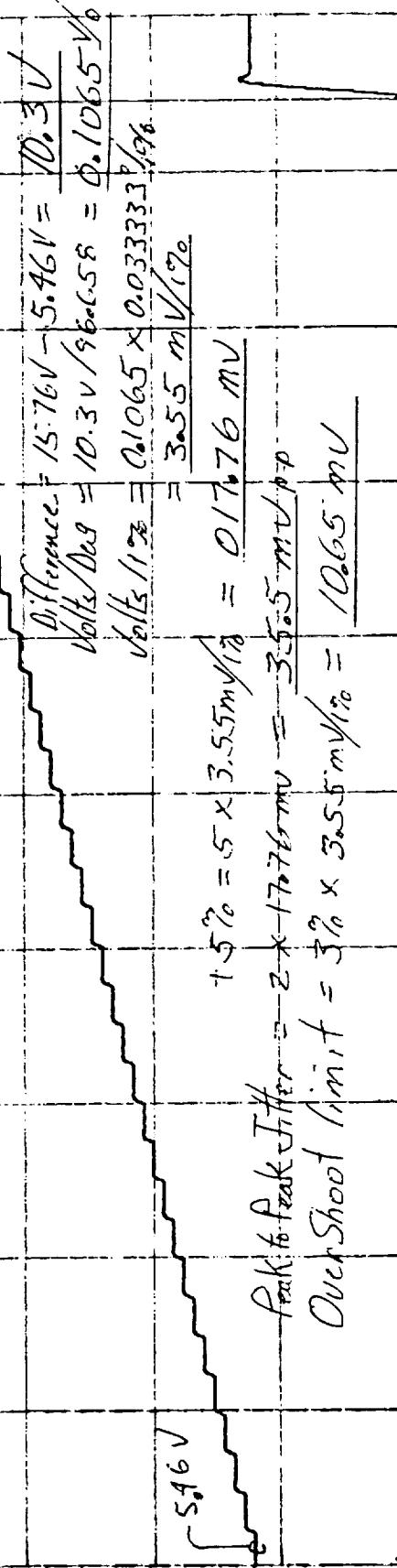
$$R_{20} = 110K$$

/D i v

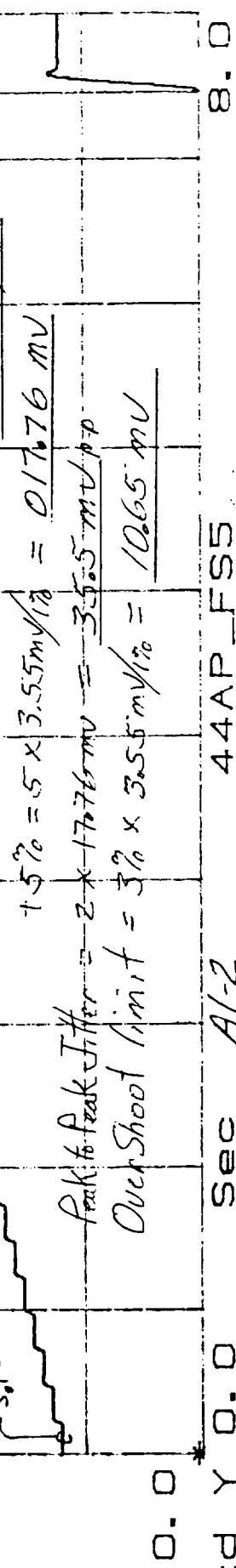
$$\begin{aligned} .165^{\circ} &= .165^{\circ} \times .1065\% = \underline{17.357 mV} \\ \pm .165^{\circ} &= 2 \times 17.357 mV = \underline{35.14 mV \text{pp}} \end{aligned}$$

Real

V



$$\begin{aligned} \text{Difference} &= 15.76V - 5.46V = 10.3V \\ \text{Volts/Deg} &= 10.3V / 96.65\% = 0.1065V/\% \\ \text{Volts/1\%} &= 0.1065 \times 0.03333333\% / 0.96 \\ &= \underline{3.55 mV/1\%} \end{aligned}$$



$$\begin{aligned} +5\% &= 5 \times 3.55mV/1\% = \underline{17.76 mV} \\ \text{Peak-to-Peak Titter} &= 2 \times 17.76 mV = \underline{35.5 mV \text{pp}} \\ \text{Over Shoot init} &= 5\% \times 3.55mV/1\% = \underline{10.65 mV} \end{aligned}$$

Fixd Y 0.0 sec A1-2 sec 44AP\_FSS 8.0

5/10: 633/70 3 44.5

Date: 1-21-99  
Test Eng:

Quality: (24) 100%  
PN: B31720-2-1C SW: 107

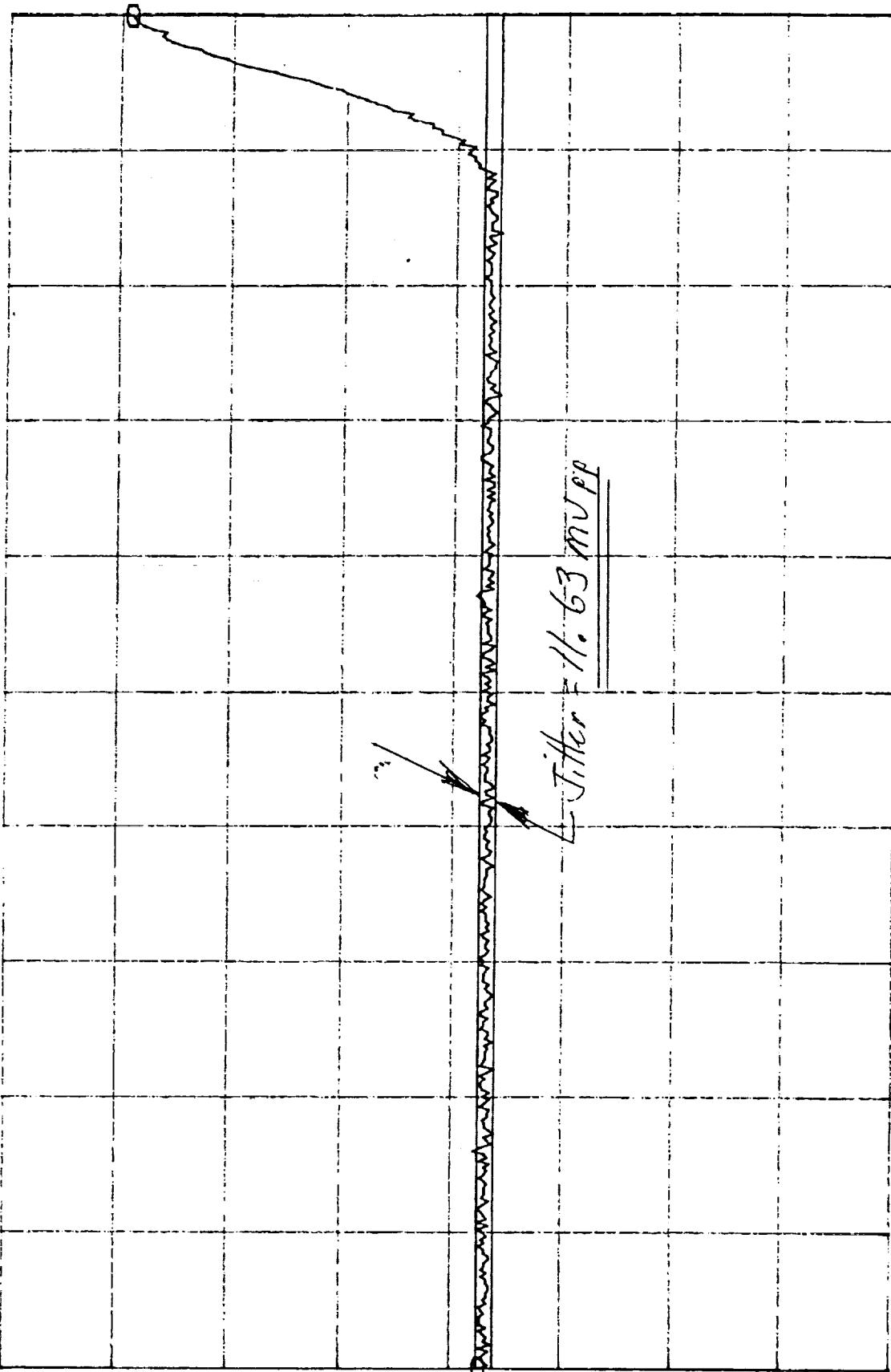
Page 11 of 12

$X_d = 33.59 \text{ mS}$     $\Delta X_d = 155.9 \text{ mS}$     $Y = 5.45603$     $\Delta Y = 11.63 \text{ mV}$

CAP TIM BUF  
5. 81

80.0  
m  
v

Real  
v



S/I/O: 633170  
P/N: 1331720-2-17 SW: 107

5. 17

Fx dXY

33.6m Sec

34.45

35.17

SC1

Test End:

Aug 8  
self

Qualif.

24  
269

189m

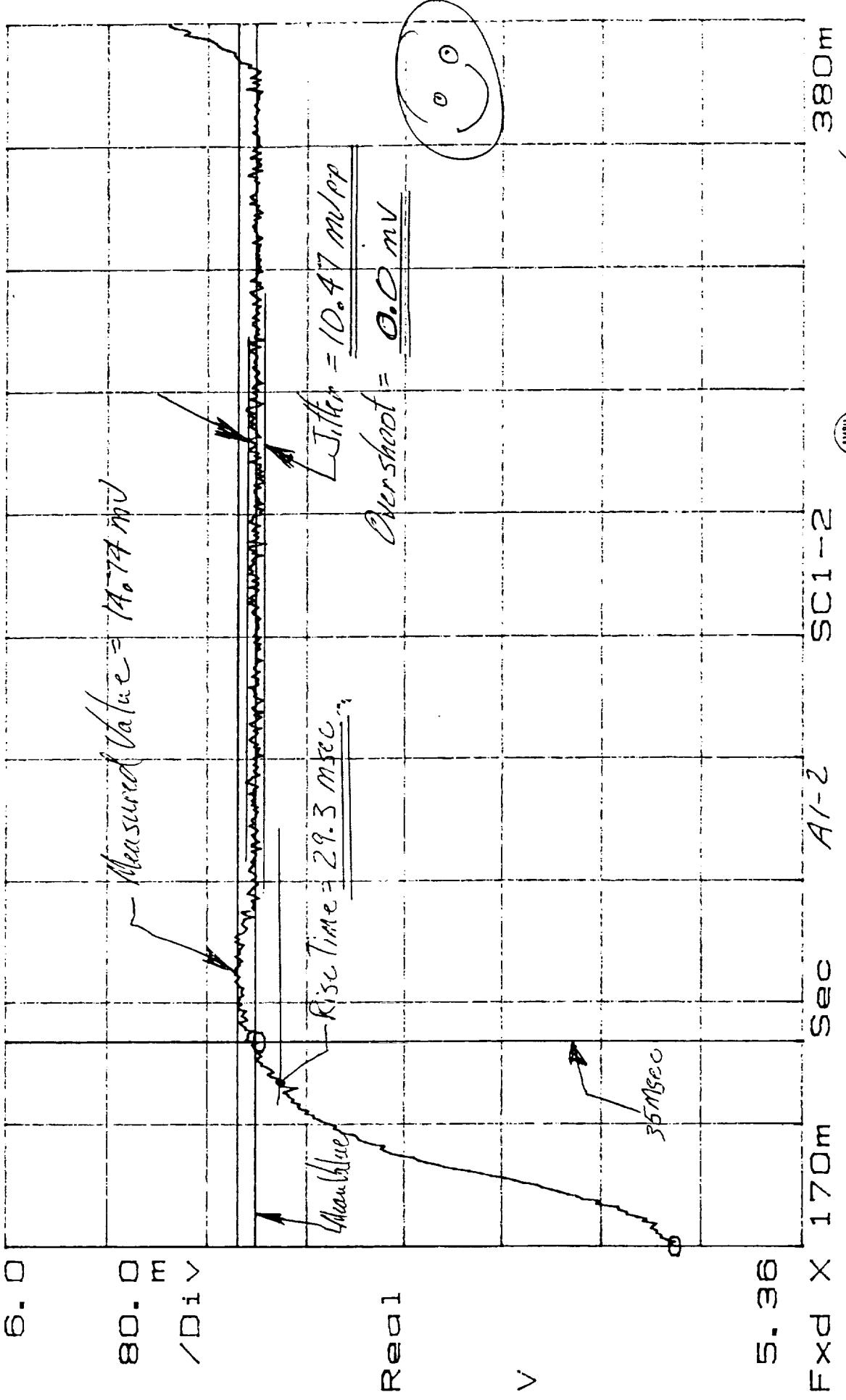
Date: 1-21-99

1331720-2-17

$X = 170$ , 3ms  $\Delta X = 35.16\text{mS}$   $\Delta Y = 337.3\text{mV}$

CAP TIM BUF

$Y = 5.81614 \Delta Y = 14.74\text{mV}$



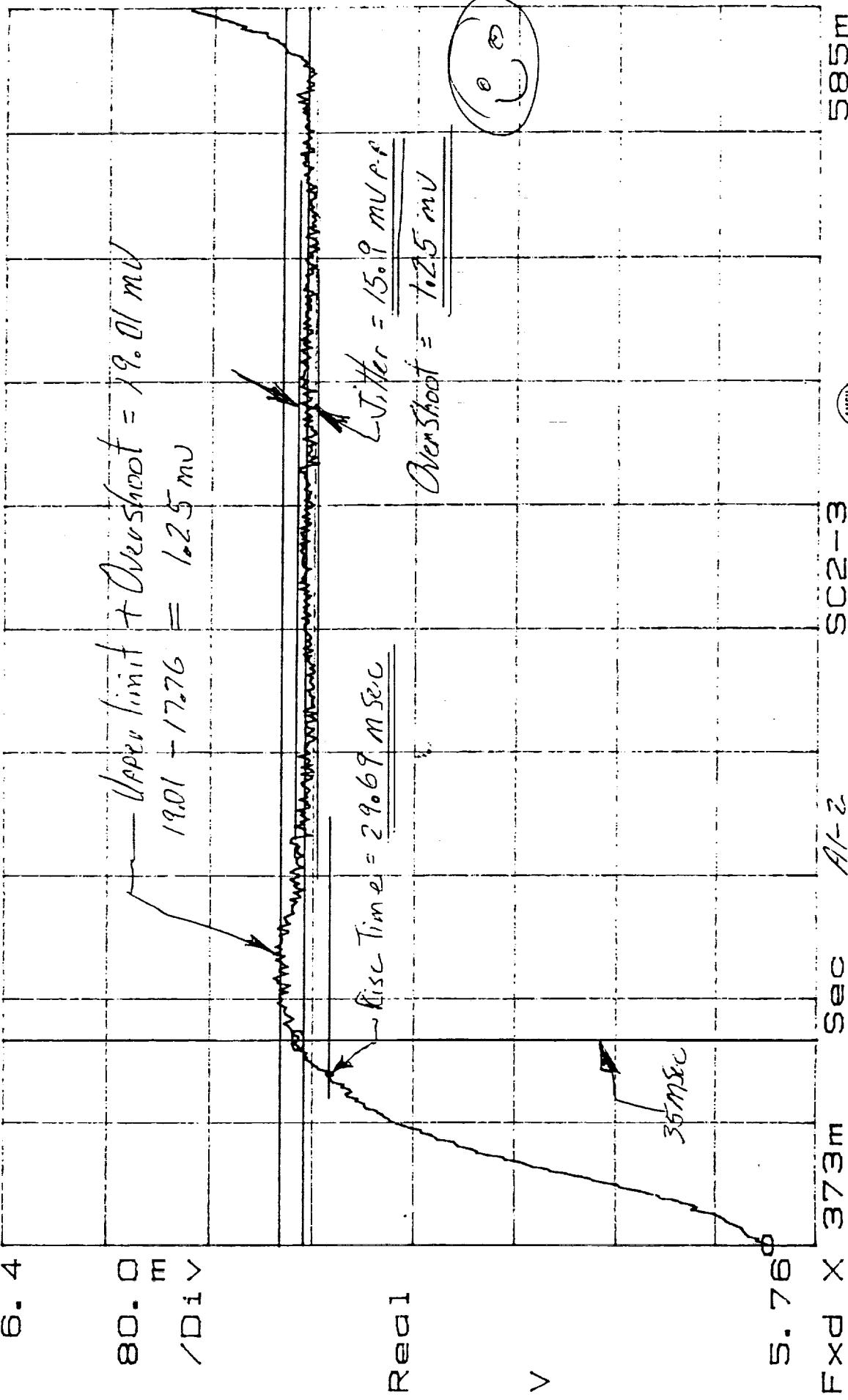
5/6: 633/70  
Ph: 133/722-2-17 SN: 102

Date: 1-21-99  
Qualtr: TA 268

$X = 372.7 \text{ ms}$     $\Delta X = 35.16 \text{ ms}$   
 $Y_a = 5.79802$     $\Delta Y_a = 373.0 \text{ mV}$

$Y = 6.1855$     $\Delta Y = 19.01 \text{ mV}$

CAP TIM BUF



FxD X 373m Sec

5.76

SC2-3

585m

Test End:

AMCU  
B  
BEAT

24  
268

No: 633110

3.11.5

Date: 1-11-72

Qualit:

99

11.

P/N: 1331720-2-1T SN: 107

$X = 575.0 \text{ ms}$     $\Delta X = 35.16 \text{ ms}$   
 $Y_d = 6.16293$     $\Delta Y_d = 355.2 \text{ mV}$

$\Delta Y = 16.29 \text{ mV}$

CAP TIM BUF  
6.72

0.08  
Div

Real

V

FxD X 575m Sec 11-2 SC3-4  
S/N: 653170 Test Eng: 3.4 & 5 Qual: 2A  
AV: 1331720-2-1T SW: 107

789m  
Date: 1-21-98

2A  
(268)  
Qual:

Date: 1-21-98

Measured value = 662.9 ms

Max time = 50.86 msec

$\Delta V_{thr} = 15.13 \text{ mVpp}$

Overshoot = 2.0 ms

100

SC3-4

Test Eng:

Qual:

AM3U  
8  
SLET

$X = 777.0 \text{ ms}$     $\Delta X = 35.16 \text{ ms}$     $Y = 6.88882$     $\Delta Y = 13.19 \text{ mV}$

CAP TIM BUJ  
7.12

80.0  
m  
v

Measured Value = 13.19 mV

Real

v

Rise Time = 30.08 msecs

Sec

1-2

3.5msec

SC4-5 (8)  
Test Eng' 34.15

6.48

Fixed X 77.7 m  
STO: 653110

m

P/N: 1551720-2-1T SN: 107

Date: 1-21-99

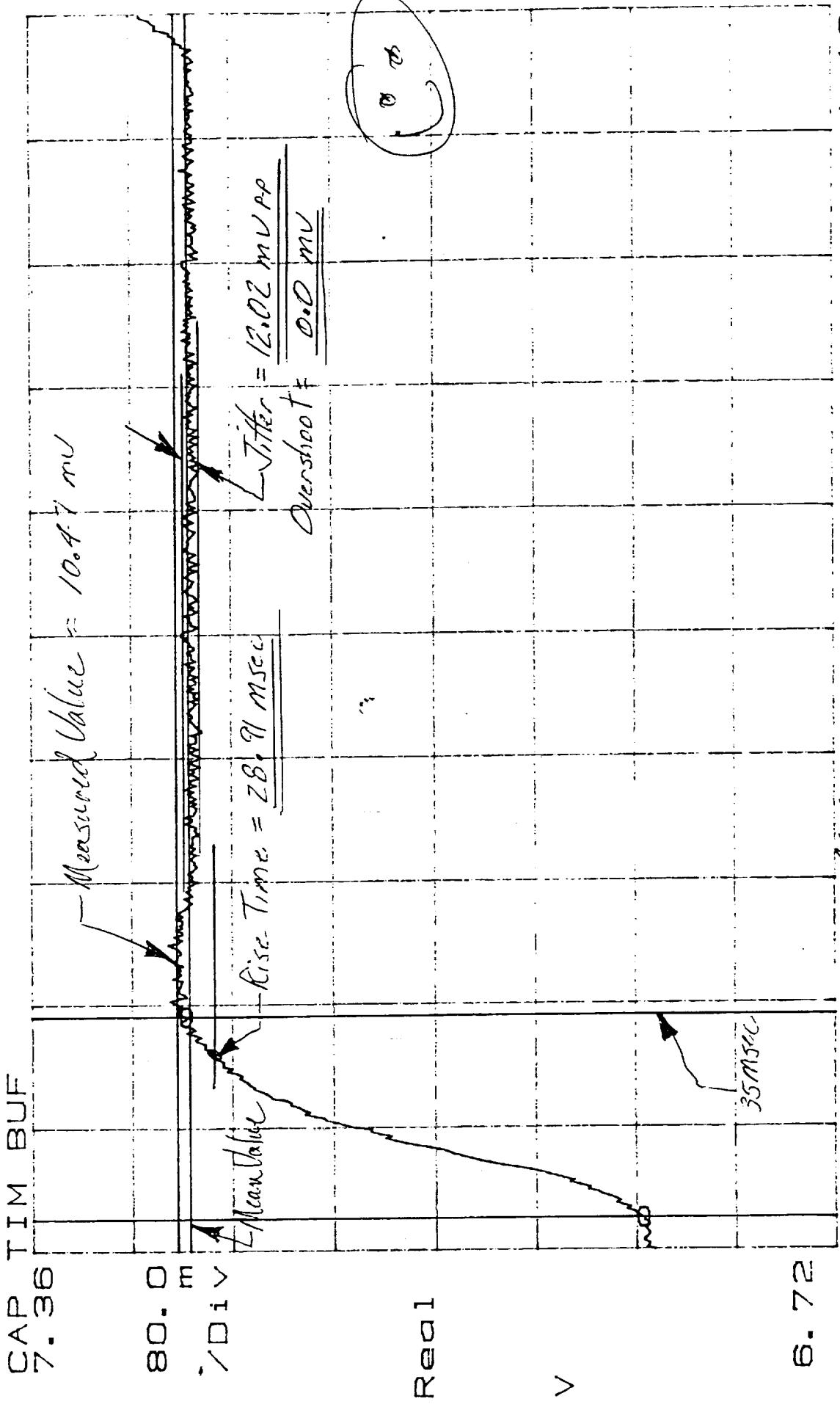
(24)  
268

Quality:

100%

$X = 980.9 \text{ mS}$     $\Delta X = 35.16 \text{ mS}$     $Y = 7.24441$     $\Delta Y = 10.47 \text{ mV}$

$\Delta Y_a = 6.87329$     $\Delta Y_a = 363.3 \text{ mV}$



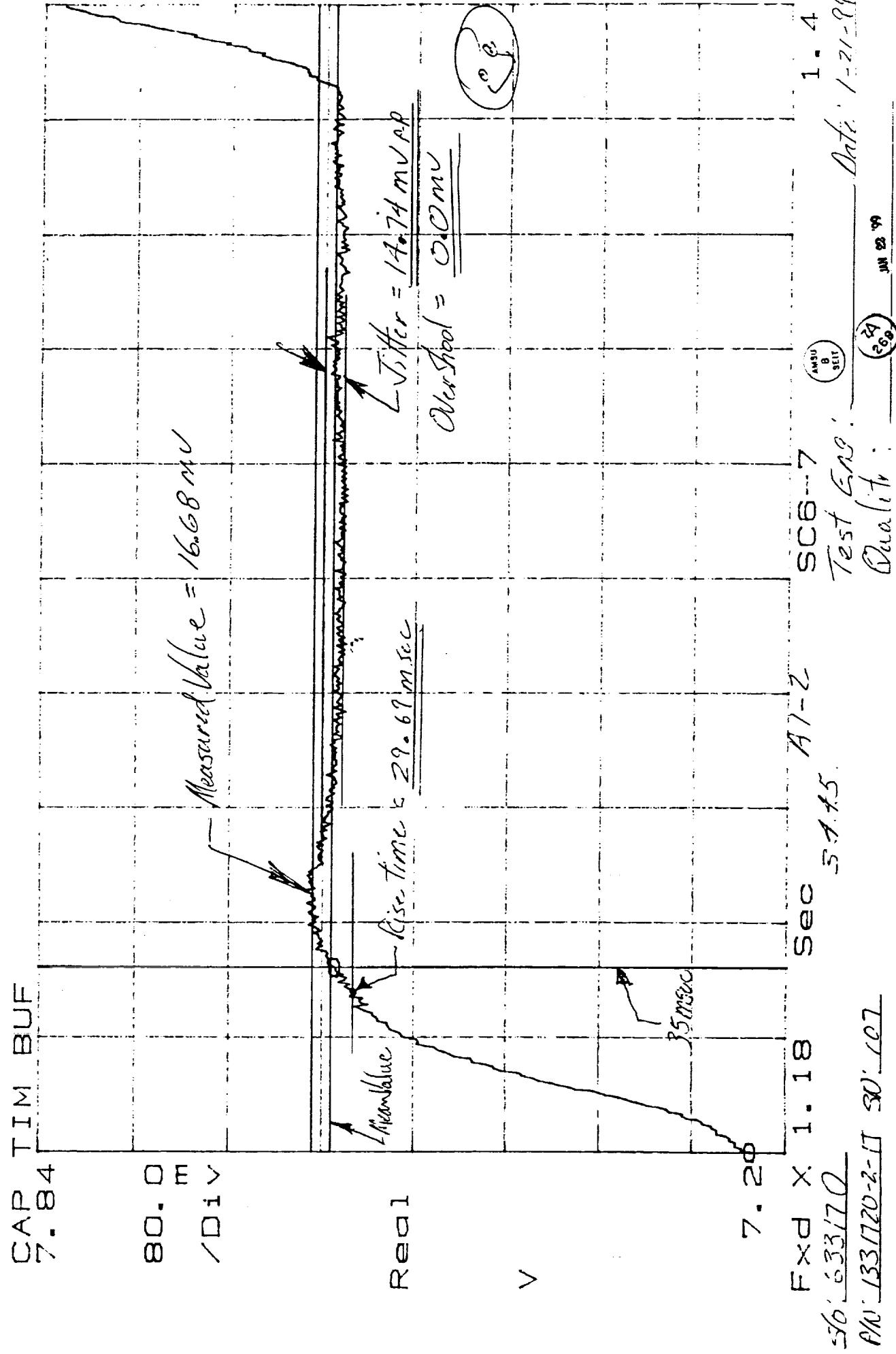
5/6: 633170  
PN: 1331720-2-17 SW: 107

SC5-6  
Test Eng.  
3.4.5  
Quality  
Date: 1-21-99  
24  
268

1.19  
1.19  
1.19

$X = 1.183 \text{ ms}$   $\Delta X = 35.16 \text{ ms}$   
 $Y = 7.23009$   $\Delta Y = 358.4 \text{ mV}$

$Y = 7.60805$   $\Delta Y = 16.68 \text{ mV}$



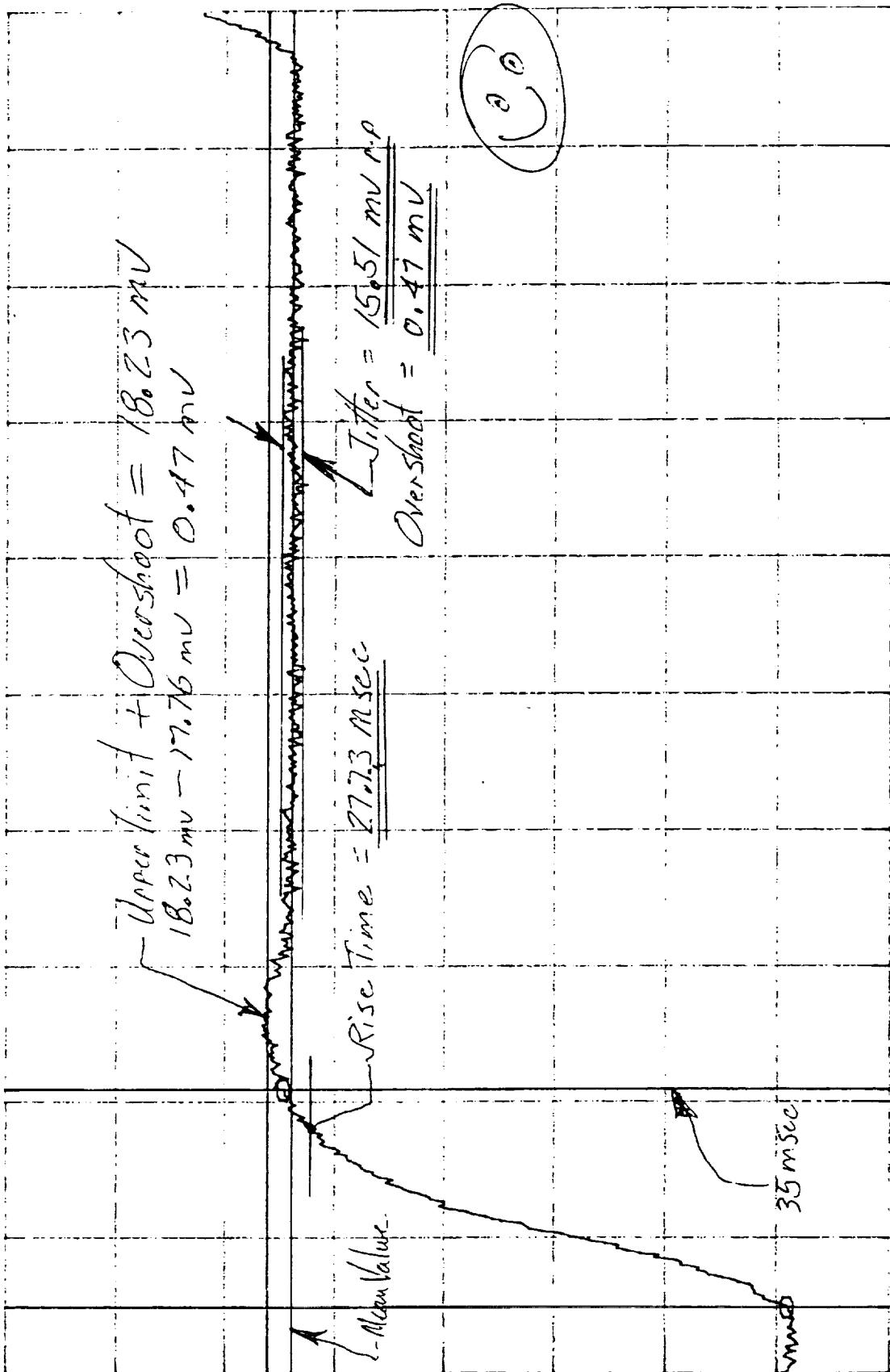
$X_d = 7.386$   $S_6$   $\Delta X = 35.16 \text{ mS}$   $V = 7.96877$   $\Delta Y = 18.23 \text{ mV}$

CAP TIM BUF  
8. 16

80. 0  
m  
/Di v

Real

v



FxD X 1.38 Sec 7.52

SC7-8

Test Eng: 1. 59

Date: 1-21-99

Qualif: 268

5/0: 633170  
P/N: 1331720-2-1T SV: 107

5.4.1.5

AMU 8  
8617  
268

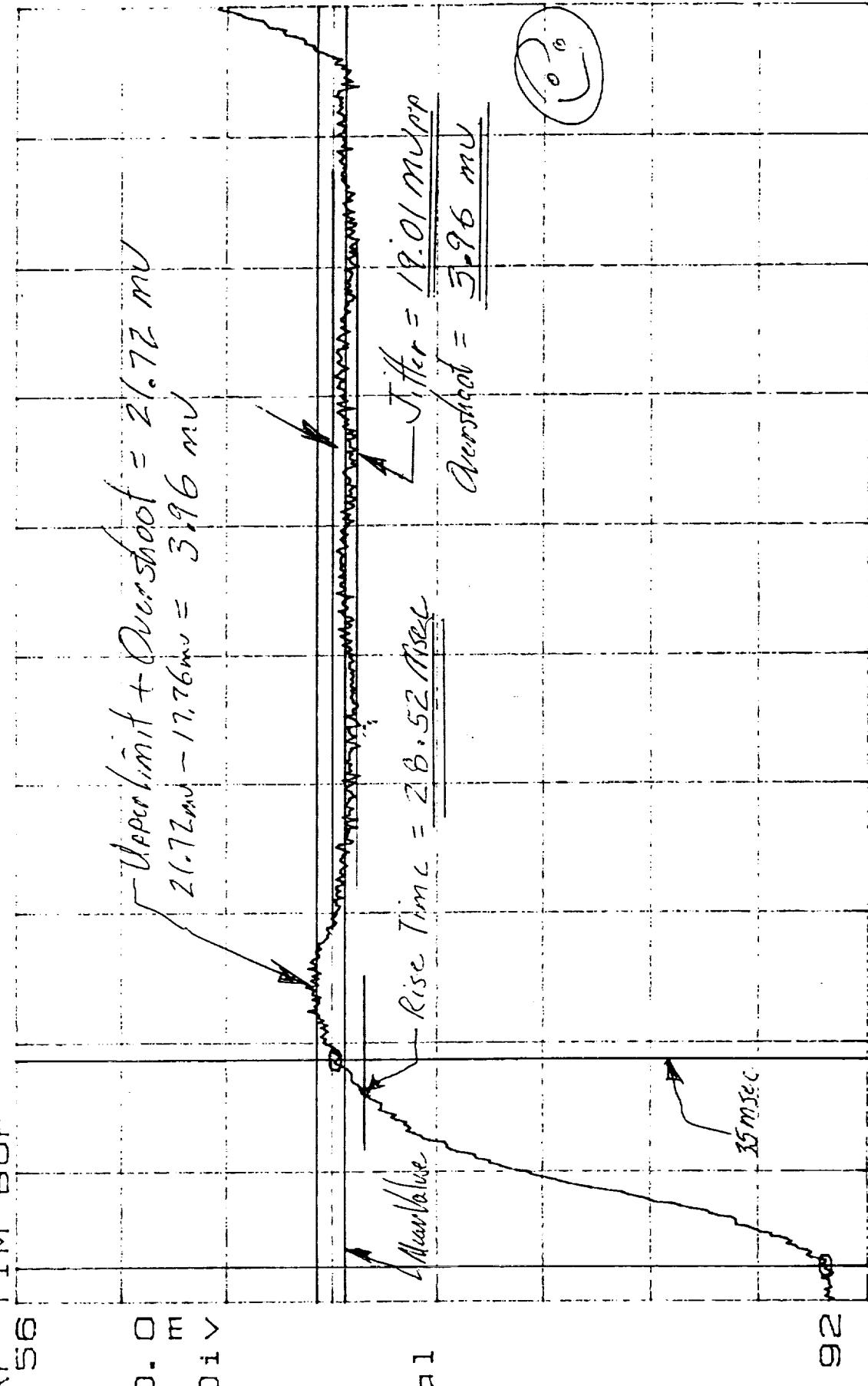
1/1

$X_d = 7.587 \text{ S}$   $\Delta X = 35.16 \text{ mS}$   $Y_d = 33018$   $\Delta Y_d = 366.5 \text{ mV}$

CAP TIM BUF  
8.56

$\gamma = 8.33115$   $\Delta \gamma = 21.72 \text{ mV}$

$\gamma = 8.33115$   $\Delta \gamma = 21.72 \text{ mV}$



Fixd X 1.58 Sec A1-2  
5/6: 653170

SC8-9

3.4.4.5 Test Eng.

Quality

1-8

Date: 1-21-99

MM DD YY

P/N: 1331720-2-1T SK: 102

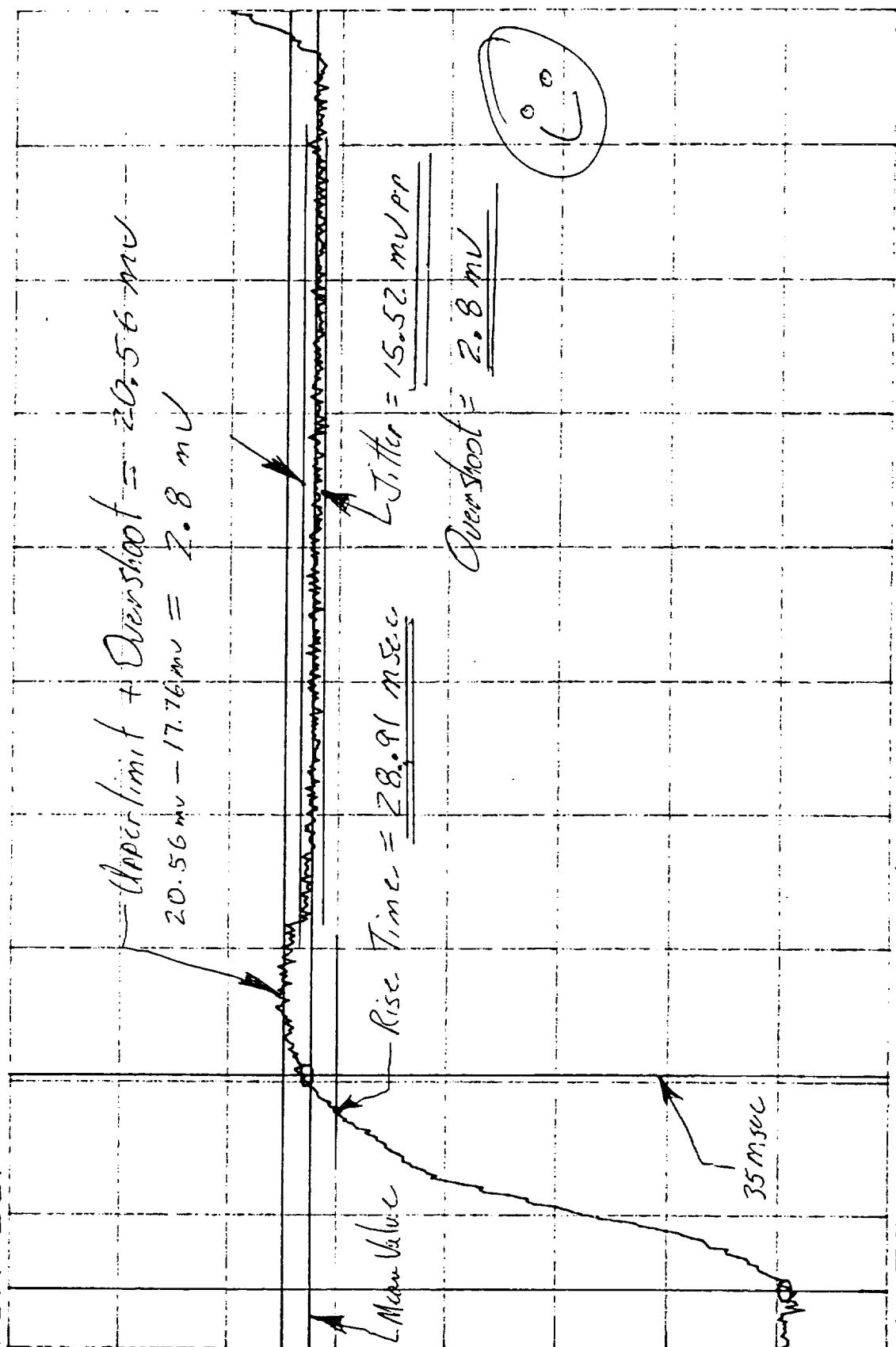
$X_a = 8.791 \text{ S}$     $\Delta X = 35.16 \text{ mS}$     $Y_a = 347.1 \text{ mV}$

$Y = 8.678669$     $\Delta Y = 20.56 \text{ mV}$

CAP TIM BUF

8. 88

0.0  
Div  
Real



8. 24

Sec

SC9-10

2. 0

Date: 1-21-99

Test Eng:

Quality

AMU 8 SELT

24 26

Jan 22 99

100

5.4A5.

S/N: 633170

SN: 107

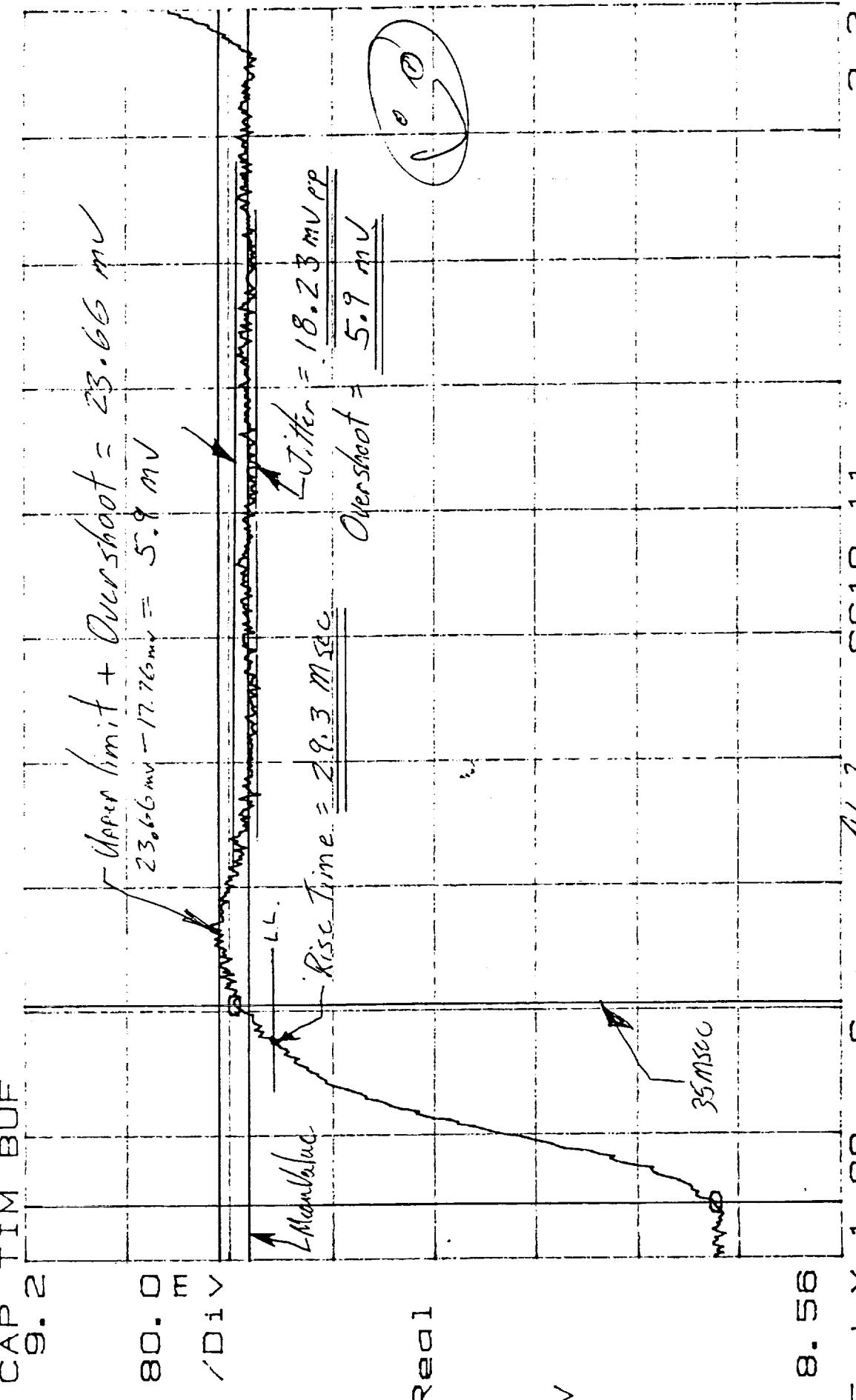
P/N:

1331720-17

Rev:

$X_a = 1.993 \text{ S}$     $\Delta X = 35.16 \text{ mS}$     $Y_a = 8.6573$     $\Delta Y_a = 377.9 \text{ mV}$

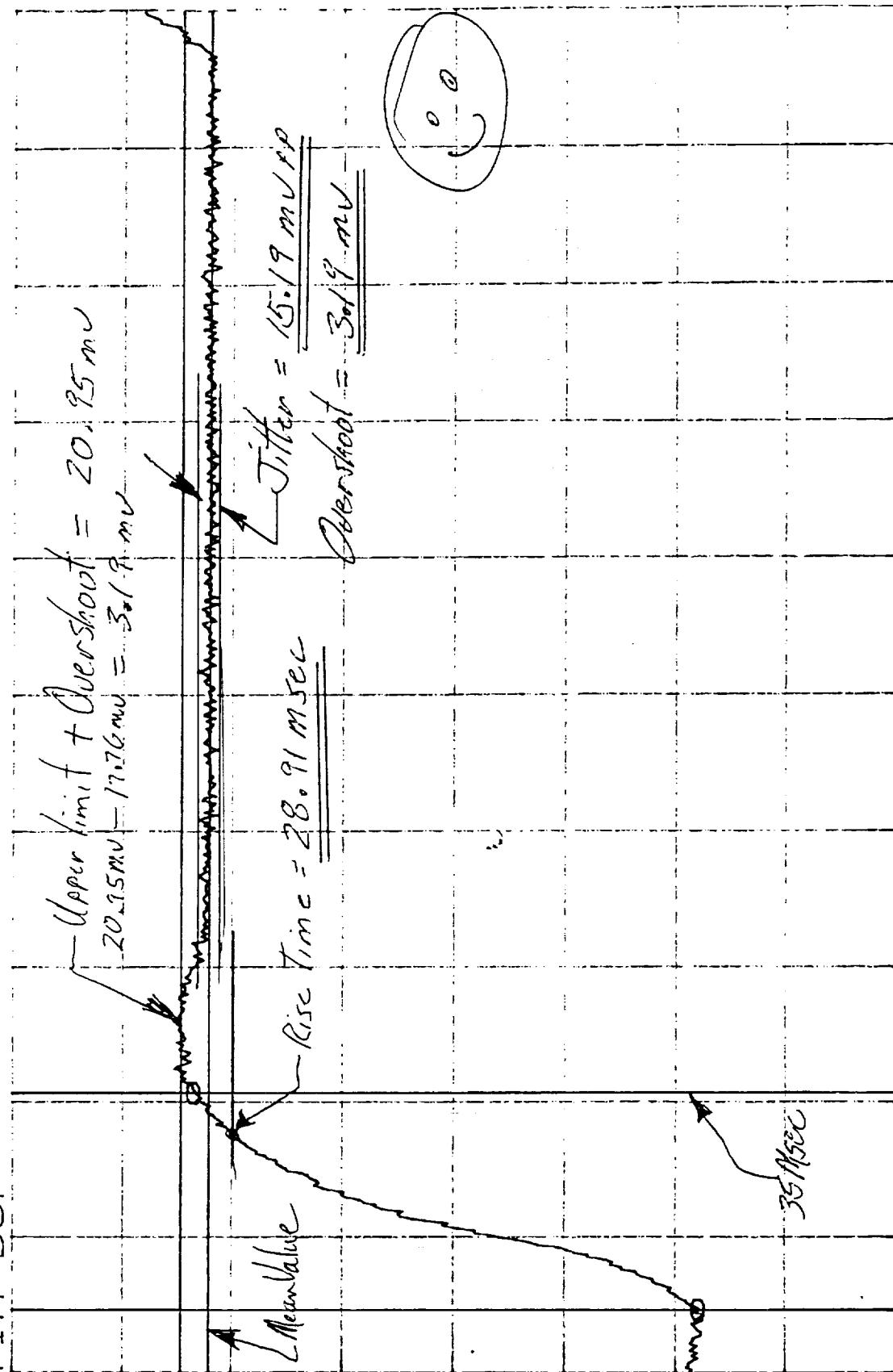
CAP TIM BUF  
9. 2



Fwd X 1. 98 Sec 3. 445 SC10-11 Test Eng 2. 2  
Rev: 633170 Date: 1/21/99  
PN: 1331720-2-1T.SV: 102 Quality: 24/26

$X_d = 2.195$  S  $\Delta X = 35.16$  ms  $Y_d = 9.02221$   $\Delta Y = 20.95$  mV

CAP TIM BUF  
9.52



Real  
V

Fixd X

A1-2

SC11-12

2. 4

S/N: 1331720-2-17 SN: 102

3.1.4.5

Test Eng -  
Qual. fr.

AMSI  
BENT  
24  
268

102  
99

Date: 1-21-91

111

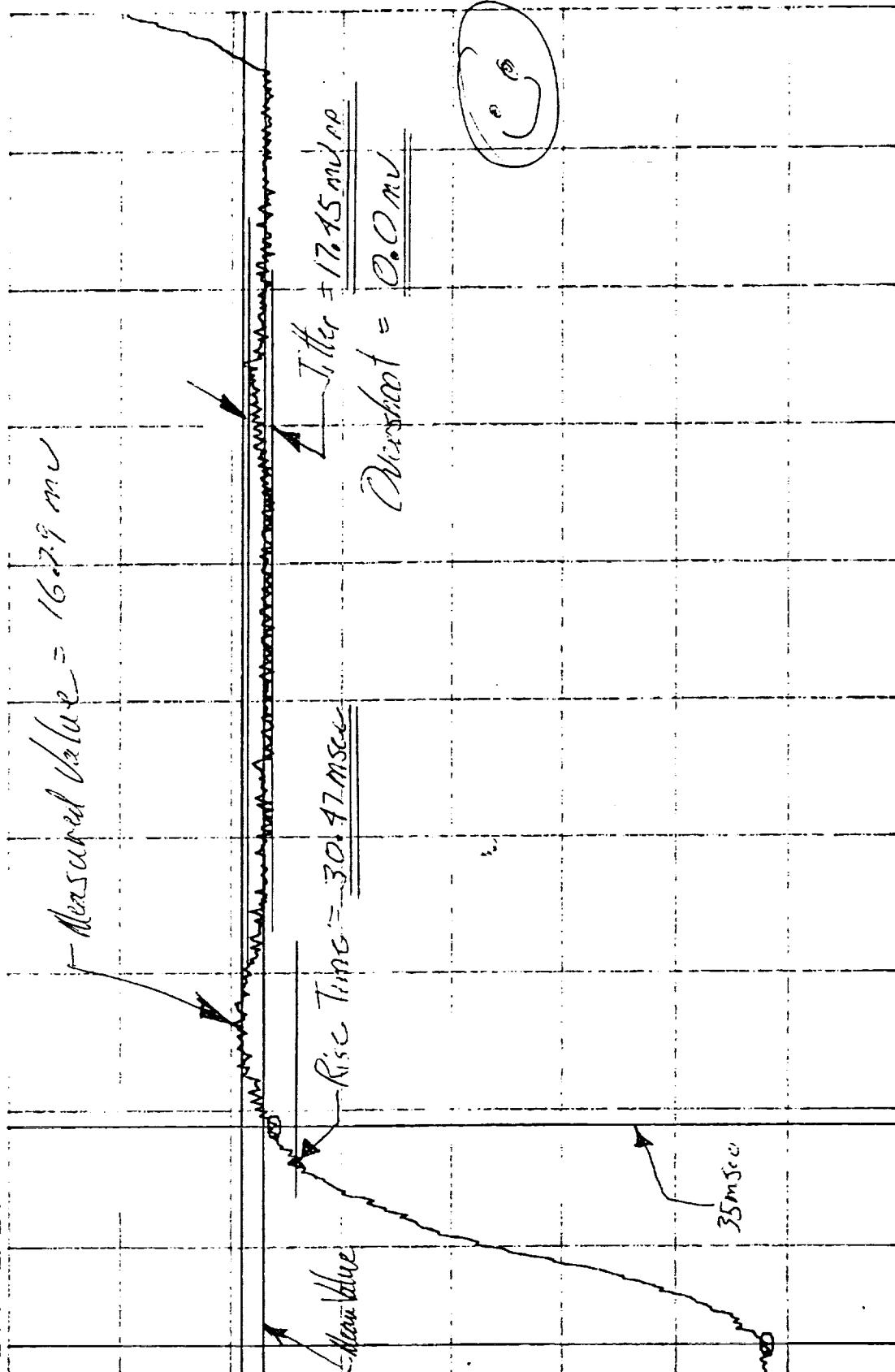
$X = 2.397 \text{ S}$     $\Delta X = 35.16 \text{ mS}$     $Y = 9.75205$     $\Delta Y = 16.29 \text{ mV}$

$Y_d = 9.37414$     $\Delta Y_d = 35.33.6 \text{ mV}$

CAP TIM BUF

9. 92

80. 0  
/ □ i v



Real

V

9. 28

Fwd X 2. 39 Sec

SC12-13

A1-2

2. 61

Rev: 633/10

P/N: 133720-2-1T SW: 107

3. A1.5

Test Eng.

ASU  
B  
SCL

JUN 23 19

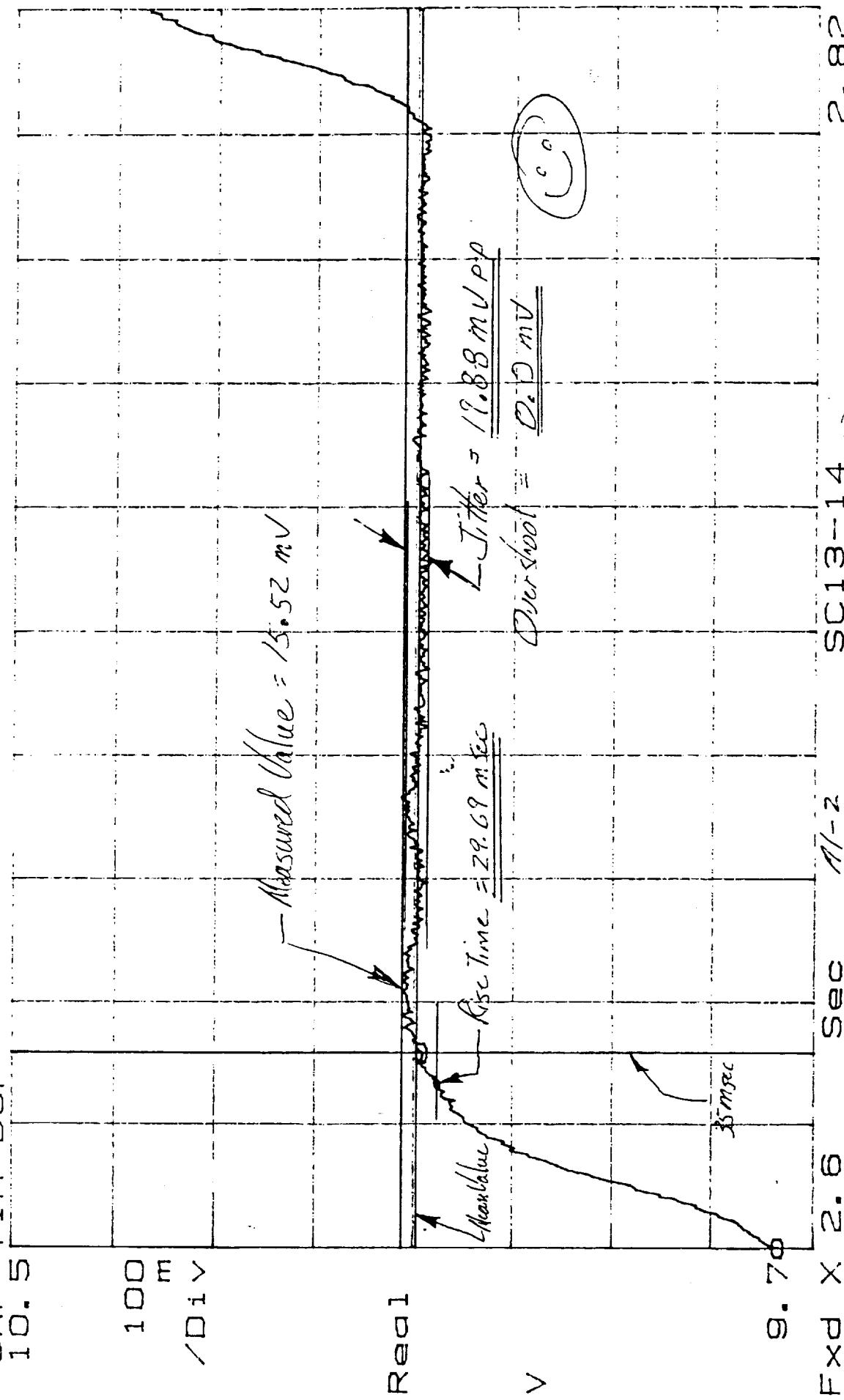
24  
268

Date: 1-22-19

1947

$X = 2.601 \text{ S}$     $\Delta X = 35.16 \text{ mS}$   
 $Y = 9.73419$     $\Delta Y = 356.8 \text{ mV}$   
CAP TIM BUF

$Y = 10.1116$     $\Delta Y = 15.52 \text{ mV}$



Fixd X 2.6 Sec  
3.4.1.5  
S/N: 653/70

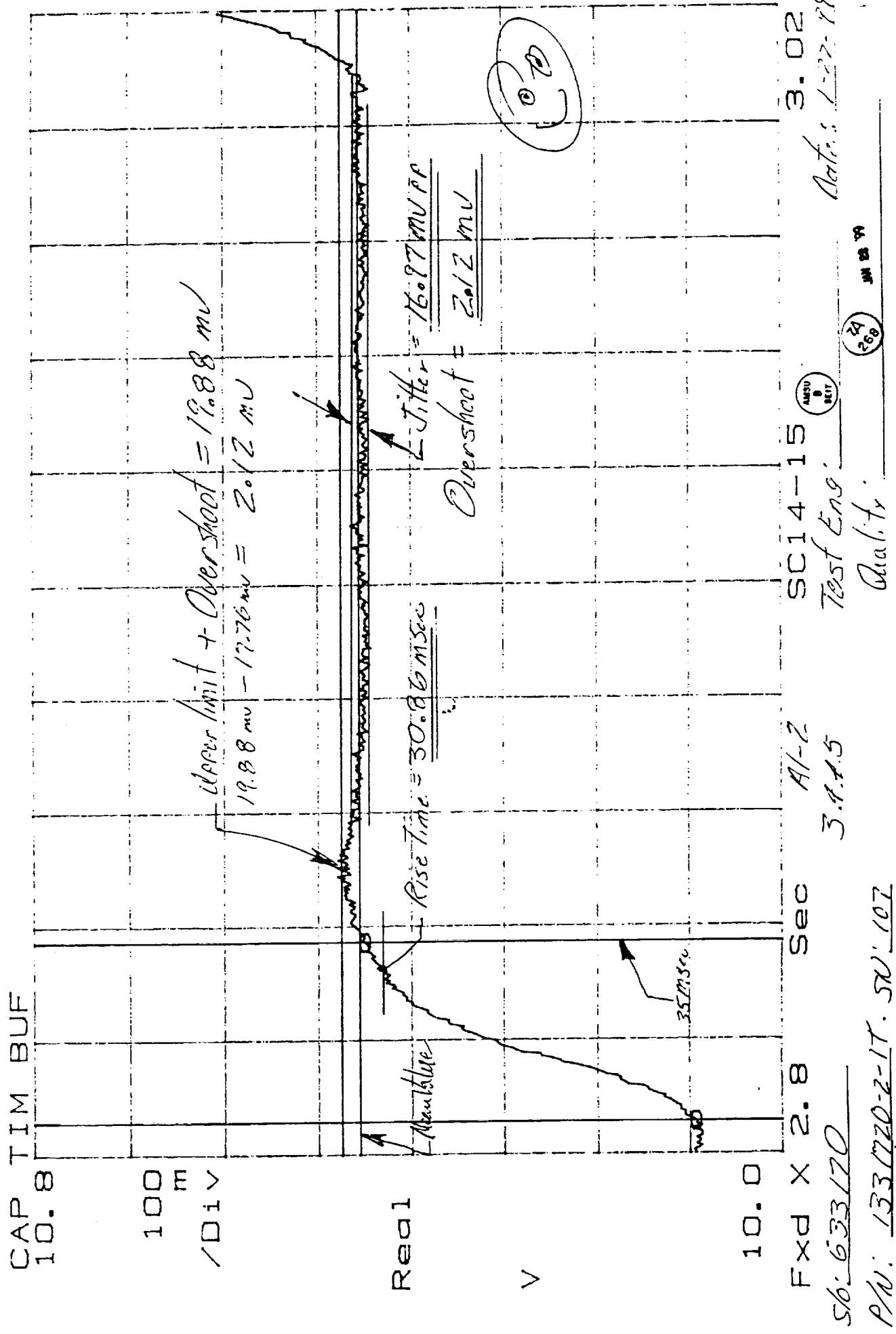
SN: 133/220-2-1T SN: 107

SC13-14 Test End  
2.82

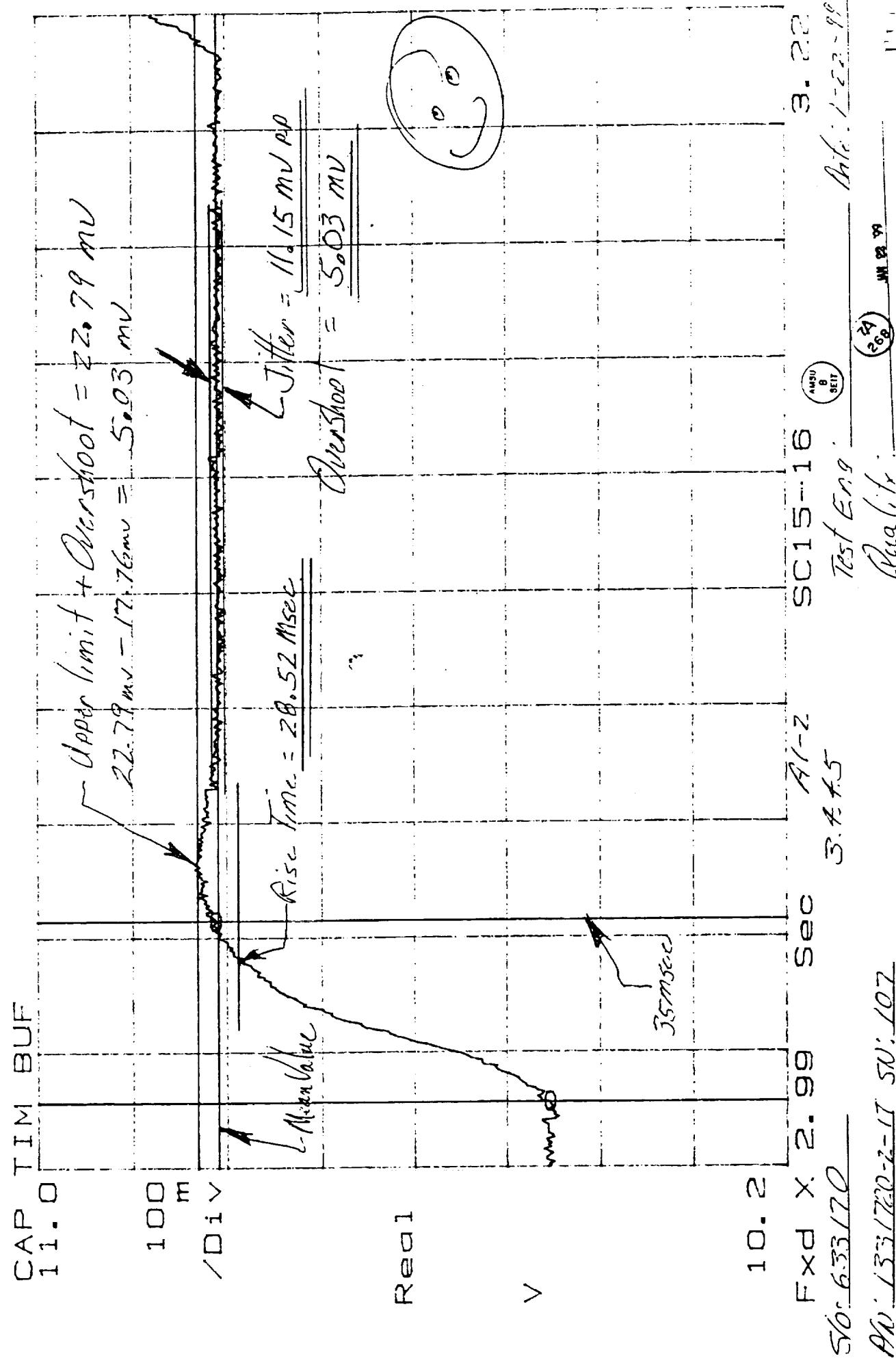
Date: 1-21-99

Qualit: 24 268 39

$X = 2.803 \text{ S}$     $\Delta X = 35.16 \text{ mS}$     $Y = 10.4751$     $\Delta Y = 19.88 \text{ mV}$   
 $Y_a = 10.0926$     $\Delta Y_a = 356.8 \text{ mV}$



$X = 3.006 \text{ mV}$     $\Delta X = 35.16 \text{ mV}$     $Y = 10.8313$     $\Delta Y = 22.79 \text{ mV}$



$X_d = 3.207 \text{ S}$   $\Delta X_d = 35.16 \text{ mS}$   $V = 11.1949$   $\Delta V = 20.85 \text{ mV}$

CAP TIM BUF

11.4

100  
m  
v

Real

v

$$\begin{aligned} \text{Upper limit + Overshoot} &= 20.85 \text{ mV} \\ 20.85 \text{ mV} - 17.76 \text{ mV} &= 3.09 \text{ mV} \end{aligned}$$

$$\text{Rise Time} = 28.91 \text{ msec}$$

Max. Value

$$\begin{aligned} \text{Initial} &= 1.357 \text{ mV} \\ \text{Overshoot} &= 3.09 \text{ mV} \end{aligned}$$

(0.0)

SC16-17  
Test Eng:  
5/6: 633170

Sec 3.4.4.5  
3.19

35msec

SC16-17  
Test Eng:  
3.4.2

5/6: 1331720-2-17

Date: 1-22-99

Qualif: 24

Run 2299

PN: 1331720-2-17 SW: 107

Page 111.

$$X_d = 3.411.1695 \quad \Delta X = 35.16 \text{mS} \quad Y = 11.5473 \quad \Delta Y = 17.94 \text{mV}$$

CAP TIM BUF

11.7

$$\begin{aligned} \text{Upper limit + Overshoot} &= 17.94 \text{ mV} \\ 17.94 \text{ mV} - 17.76 \text{ mV} &= 0.18 \text{ mV} \end{aligned}$$

100

mV

Mean Value

Rise Time = 28.12 msec

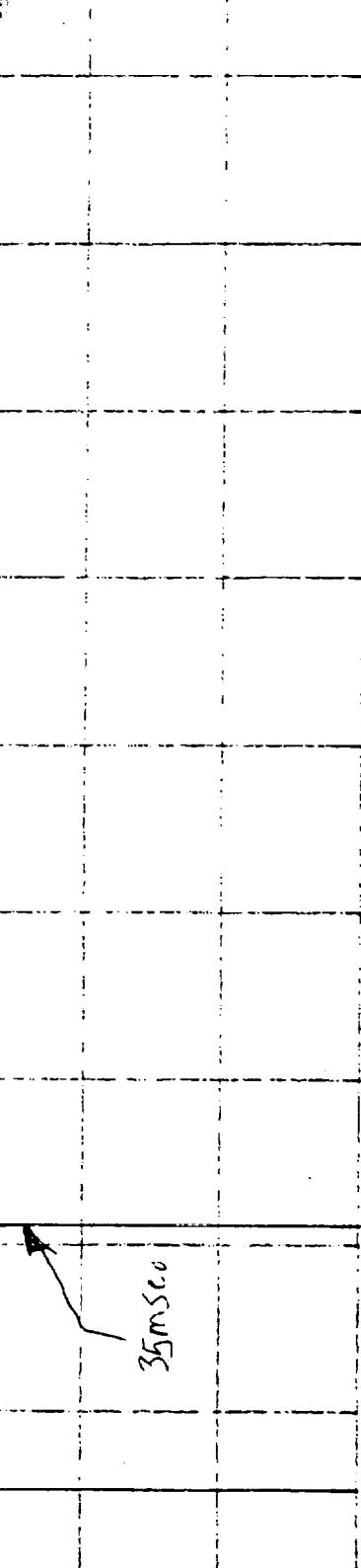
$$\text{Jitter} = 15.52 \text{ mV pp}$$

$$\text{Overshoot} = 0.18 \text{ mV}$$

Real

100

V



FxD X 3.4

Sec

SC17-18

3.62

Test Eng

3.44.5

5/10/633170

Ref: 133170-2-1T SW:107

Dialit

260

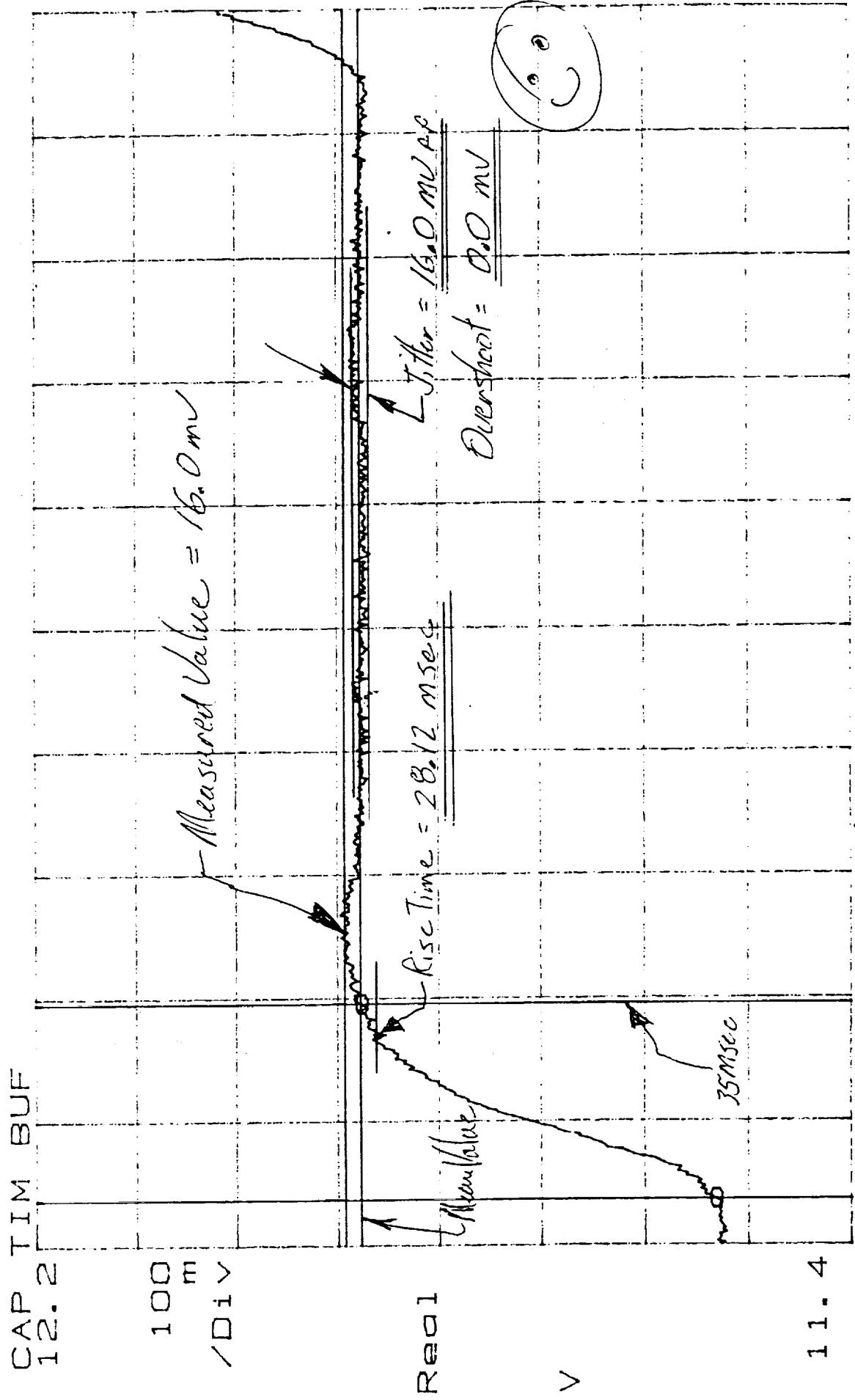
AMU  
8  
SET

Date: 1-22-70

JUN 22 1970

$$X_a = 3.614 \text{ S} \quad \Delta X = 35.16 \text{ mS} \quad Y_a = 1.5295 \quad \Delta Y_a = 345.4 \text{ mV}$$

$$\gamma = 11.8926 \quad \Delta \gamma = 16.0 \text{ mV}$$



11. 4  
16:653/10

11. 5  
3. 11.5

SC18-19  
Test Eng'

AMBIENT  
B  
TEST  
SALT

3. 83  
JUL 1-22-99

11/1/1999-2-17 50:107

Dialit.

JUL 26 '99

24  
26

11:

$X_d = 3.816 \text{ S}$     $\Delta X_d = 35.16 \text{ mS}$     $V = 12.2463$

CAP TIM BUF

$\Delta Y_d = 1.8701$     $\Delta Y = 15.03 \text{ mV}$

Measured Value =  $15.03 \text{ mV}$

Max Value

Set Time =  $29.69 \text{ msec}$

100  
m  
V

Settling =  $16.48 \text{ mV}_{P-P}$

Overshoot =  $80 \text{ mV}$

Real

V

11.6

Fwd X 3.8

sec

SC19-20

(AMSU  
B  
TEST)

4.03

5/10/1991 17:00-2:17 SK 107

3.4.4.5

Date: 1-22-99

Qualit:

24  
268

PAGE 1

$X = 4.017.2318$   $\Delta X = 35.16 \text{ mS}$

$Y = 12.6023$   $\Delta Y = 356.8 \text{ mV}$

CAP TIM BUF  
12.9

100  
m  
Div

Real

V

Measured value + 17.45 mV

Peak value  $= 29.3 \text{ mSec}$

Jitter  $= 12.58 \text{ mV p-p}$

Overshoot  $= 0.0 \text{ mV}$

(OK)

Fixd X 4.01 Sec  
5/6: 653170

SC20-21  
3.4.4.5  
Test Eng: (8)  
Qualify:

P/N: 1331720-2-1T SW: 102

$\Delta Y = 17.45 \text{ mV}$

$\Delta Y = 17.45 \text{ mV}$

4. 2.3  
SC20-21  
Test Eng: (8)  
Qualify:

AMSD  
Best

Date 1-22-99  
AM 22 (22)

PM 11 (23)

$X = 4.221 \text{ S}$   $\Delta X = 35.16 \text{ mS}$

$Y = 12.9548$   $\Delta Y = 348.7 \text{ mV}$

$\Delta Y = 13.09 \text{ mV}$

CAP TIM BUF

13.3

100  
m  
v

Real

v

Measured Value = 13.09 mV

Rise Time = 30.08 msec

$\tau_{T,thr} = \frac{16.49 \text{ mV}}{0.0 \text{ mV}}$

Overshoot + 0.0 mV

35msec

12.5

FxD X. 4.22

Sec 3.1A.5

SC21-22

Test Eng. ⑧ 268

4.4.1

S/N: 15331720-2-17 50:102  
P/N: 15331720-2-17

ANSI  
8  
SERIAL

268

Quality -

JUN 22 19

Date: 1-22-19

11/1

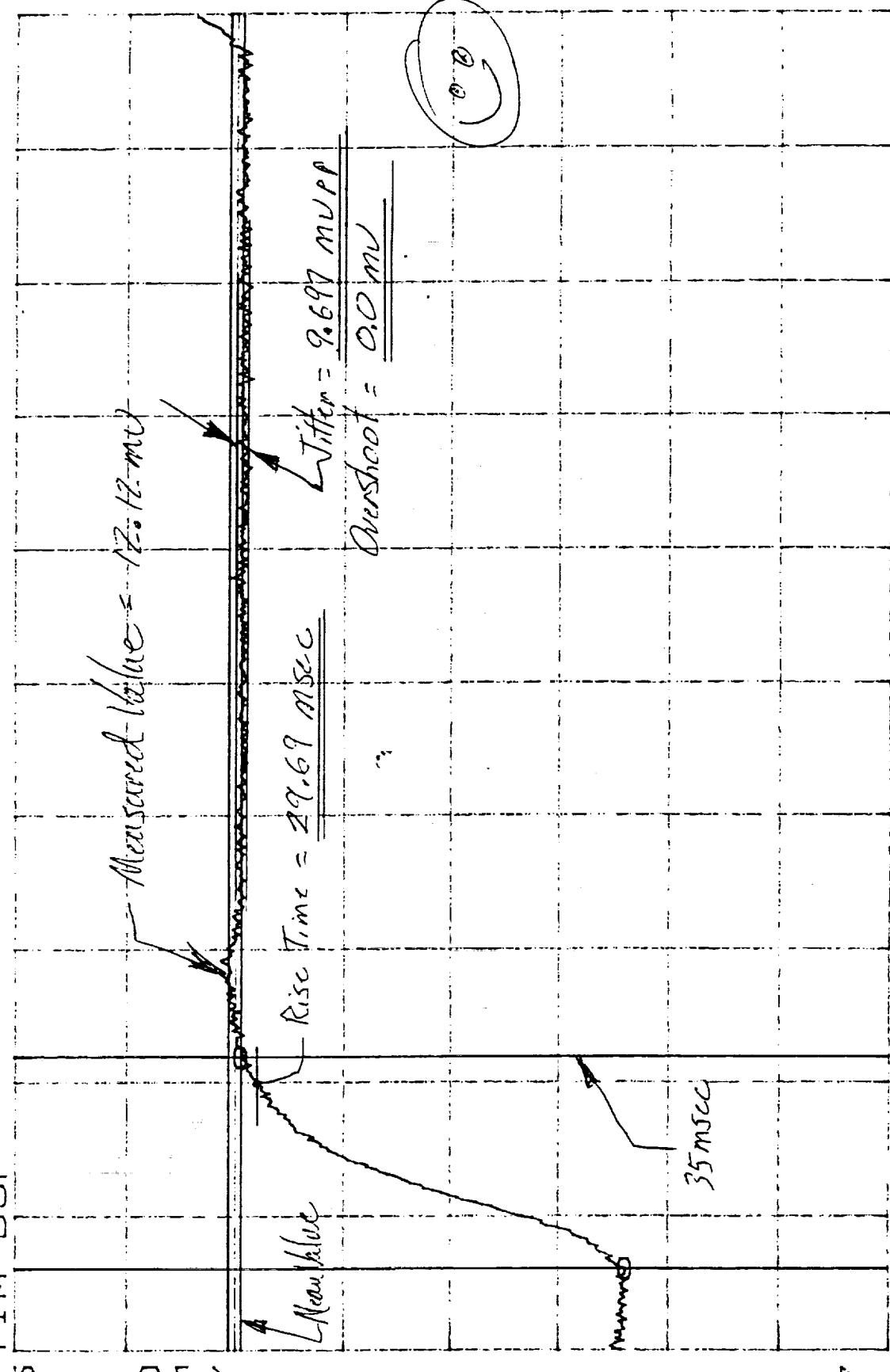
$\Delta X = 35.16 \text{ mS}$

$X = 4.423 \text{ S}$   
 $Y_0 = 12.9373$   $\Delta Y_0 = 35.8 \text{ mV}$

CAP TIM BUF  
13.5

$Y = 13.3056$

$\Delta Y = 12.12 \text{ mV}$



12.7 4.41 Sec 11-2 SC22-23 4.63

Test Eng: 3.4.4.5.

SB: 633170

PN: 1331700-2-II Rev: 107

AMU B  
SEL

24  
268

MM 22 99

Date: 1-22-99

Qualtr

$X_d = 4.626 \text{ S}$     $\Delta X = 35.16 \text{ mS}$

CAP TIM BUF  
14.0

$Y = 13.6659$

$\Delta Y = 14.55 \text{ mV}$

100  
m  
Div

Measured Value = 14.55 mV

Recd

Measured Value

Rise Time = 28.01 msec

Jitter = 3.09 mV A.A.

Overshoot = 0.0 mV

V

13.2

Fwd X 4.62

Sec 1/2

SC23-24

Test Chg.

4.84

SO: 653170

P/N: 1331720-2-17 SW: 107

3.44.5

Date: 1-22-99

24  
268

Qualtr.

11

$X = 4.828 \text{ S}$   $\Delta X = 35.16 \text{ mS}$   $\gamma = 14.0222$   $\Delta Y = 17.45 \text{ mV}$

$Y_d = 13.6493$   $\Delta Y_d = 360.0 \text{ mV}$   
CAP TIN BUF  
14.3

100  
m  
/D i v

Measured Value = 17.45 mV

Real

Mean Value

Rise Time = 28.12 nsec

Jitter = 15.54 mV

Overshoot = 0.0 mV

13.5  
Sec A1-2  
V

35msic

13.5  
Sec A1-2  
5.0A.5  
FD X 4.82

SC24-25

5.04

5.0A.5

5.0A.5

STO: 633170  
PN: 133170-2-17 SN: 107

Test Eng.  
Quality:

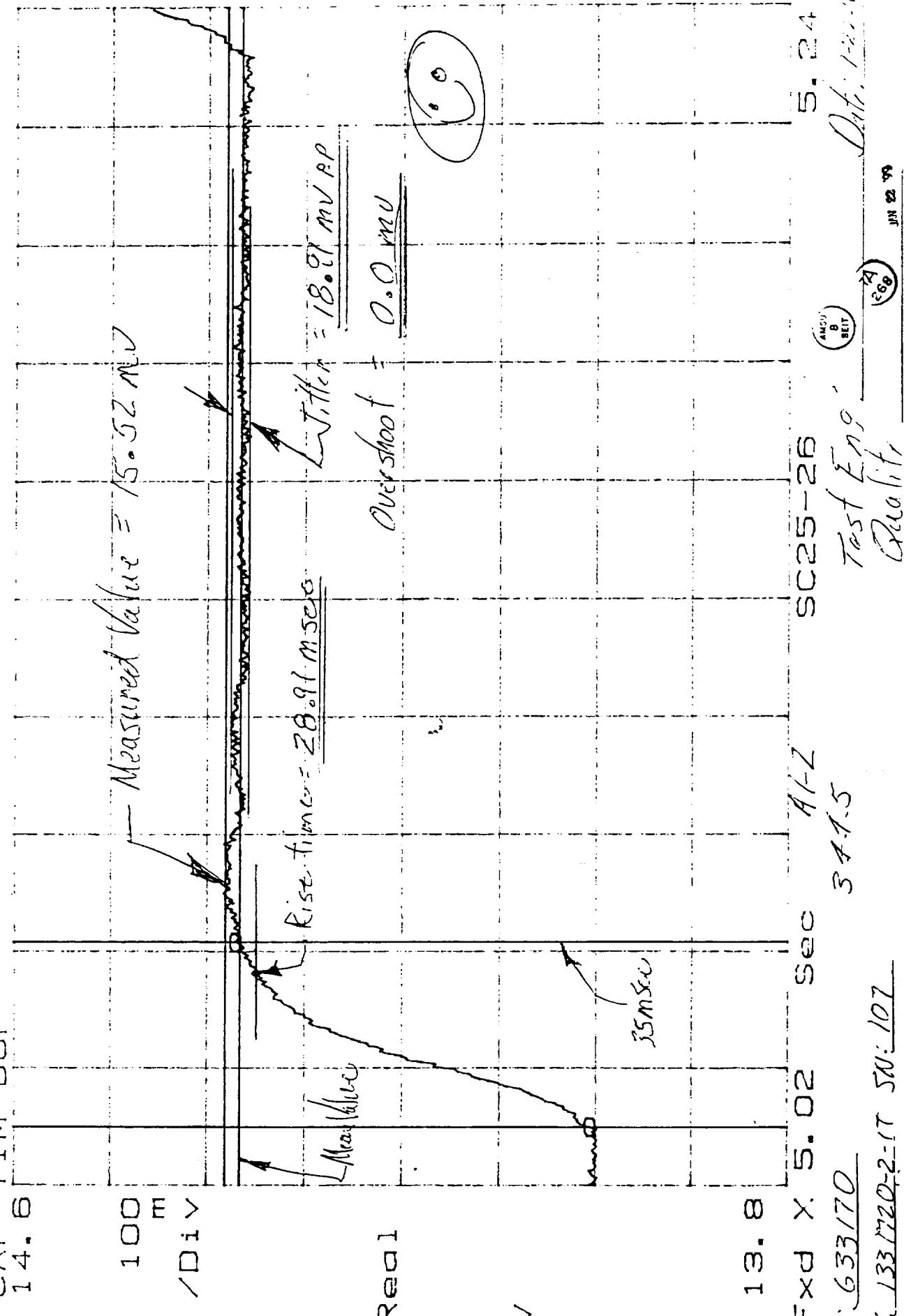
Date: 1-22-99  
JN 22 99

(24)  
268

P11

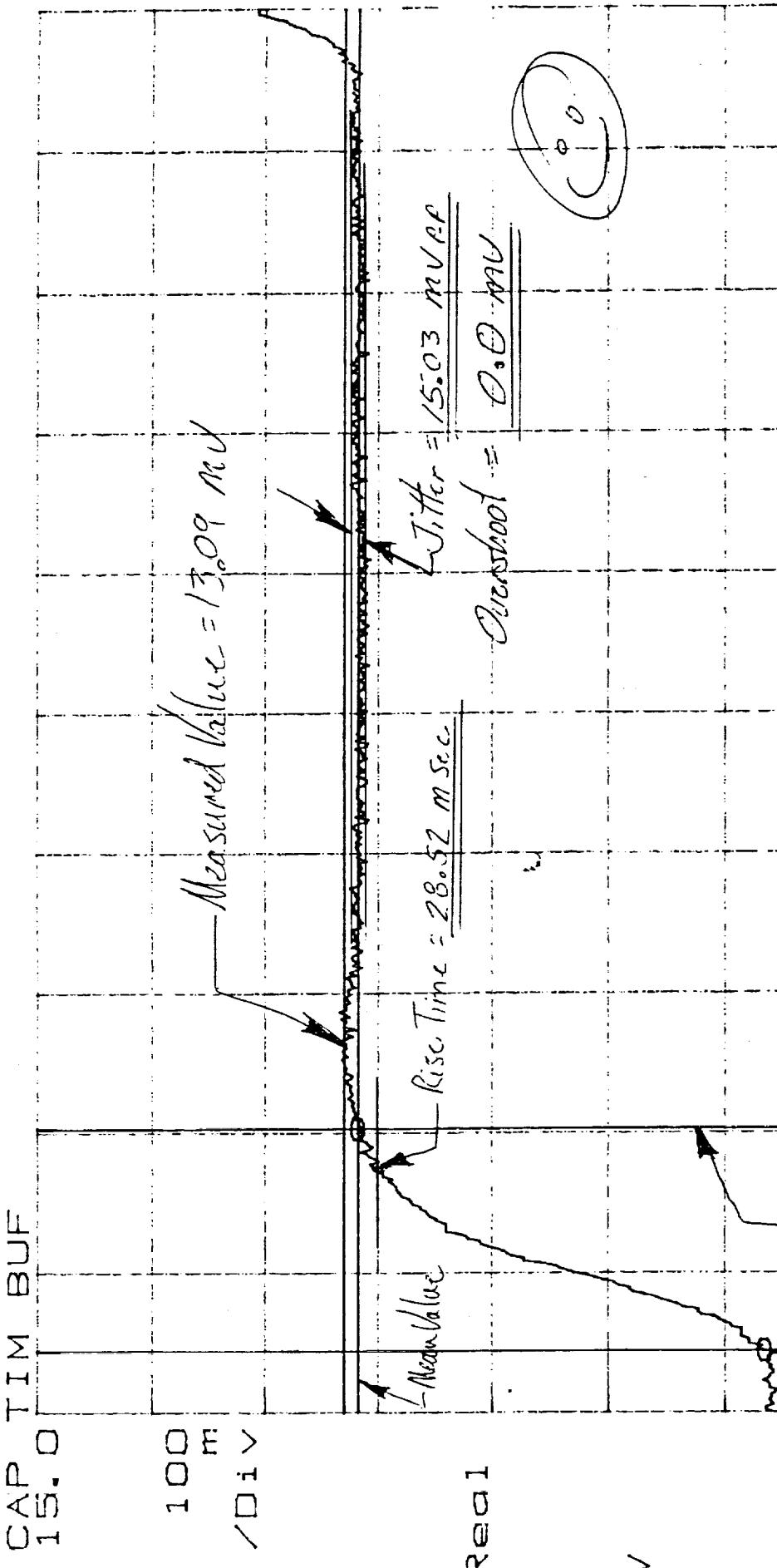
$$\begin{array}{ll} X = 5.031 & \Delta X = 35.16 \\ Y_d = 14.0045 & \Delta Y_d = 364.9mV \end{array}$$

$$Y=14.3808 \quad \Delta Y=15.52\text{mV}$$



$X_d = 5.233 \text{ S}$     $\Delta X = 35.16 \text{ ms}$   
 $Y_d = 14.3645$     $\Delta Y_d = 351.9 \text{ mV}$

$Y = 14.7295$     $\Delta Y = 13.09 \text{ mV}$



14.2

Fwd X 5.22  
S/N: 653170

PN: 1331720-2-1T. SN: 107

AI-2

SC26-27

Test Eng'g

Quality

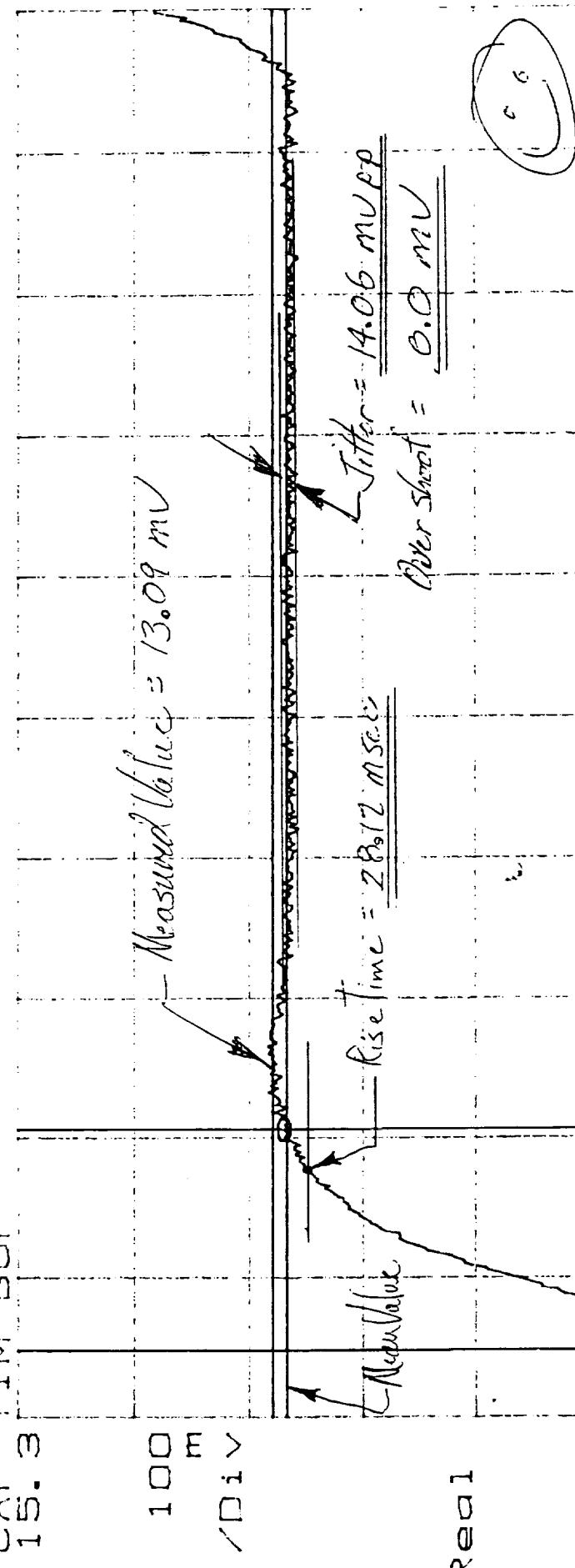
5.45

Date 1-22-93  
AM 88 99  
4  
268

14.1

$X_0 = 5.437 \text{ S}$   $\Delta X = 35.16 \text{ mS}$   
 $Y_0 = 14.7213$   $\Delta Y = 347.1 \text{ mV}$

$\gamma = 15.0794$   $\Delta \gamma = 13.09 \text{ mV}$



V

14.5

Fxd X 5.43 Sec 5.445

510:633170  
PN: 1331720-2-1T. SW: 107

AMBIENT

AMBIENT

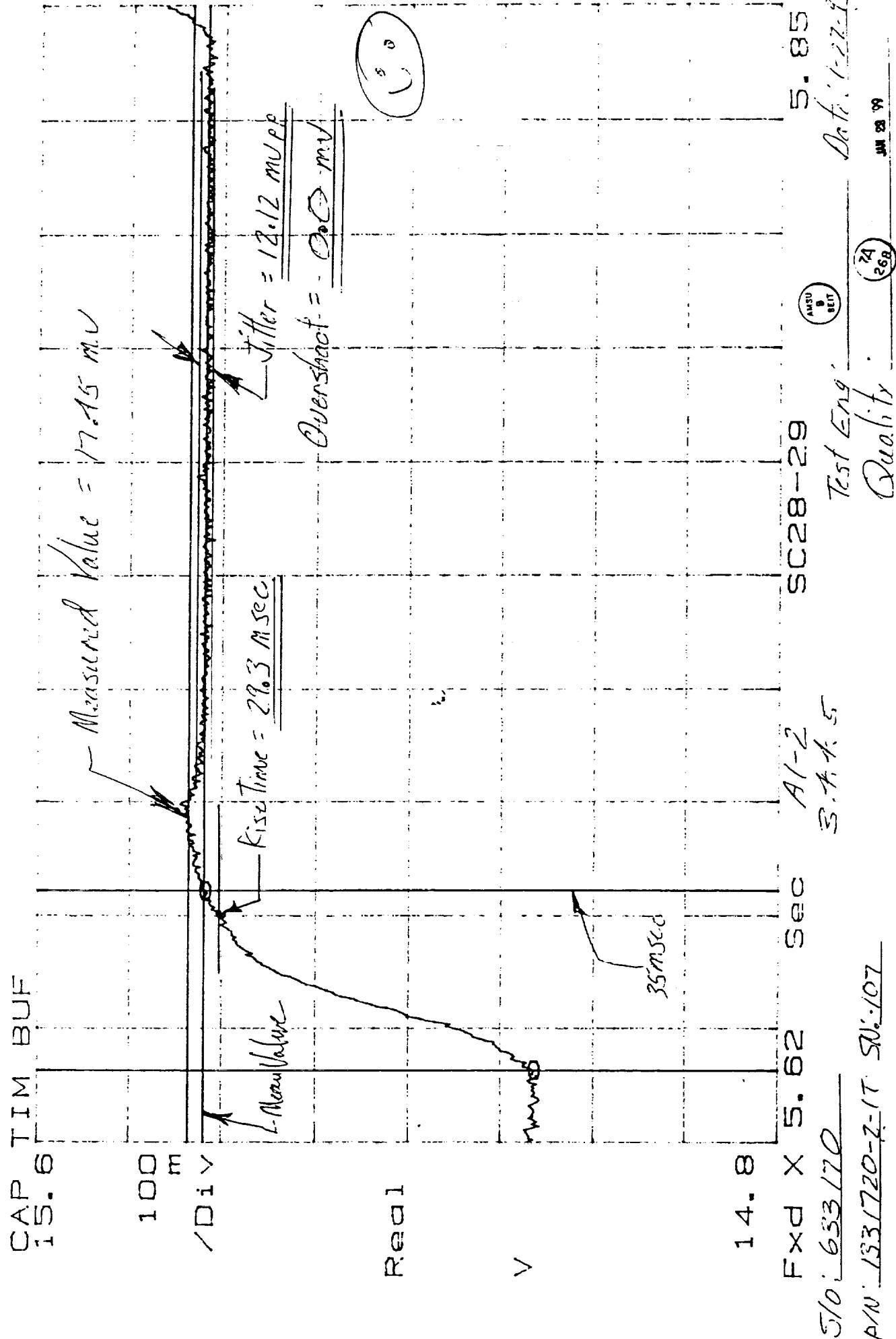
Test Eng.  
Dual f.

24  
268  
JUN 22 '71

5. 65  
Amico 1331720-2-1T  
JUN 22 '71

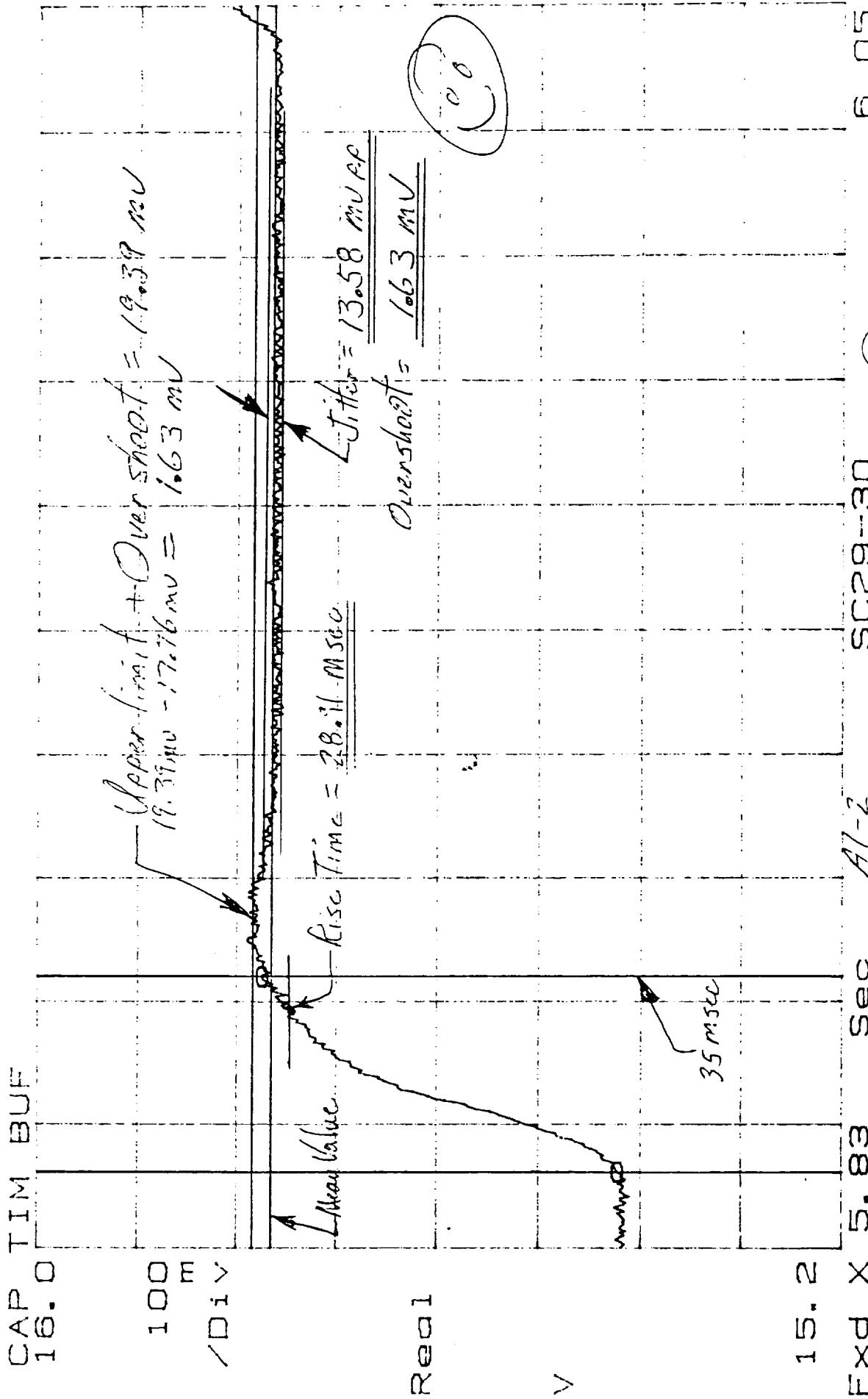
$X_a = 5.638$  S    $\Delta X = 35.16$  mS    $\Delta Y_a = 355.2$  mV

$Y = 15.4361$     $\Delta Y = 17.45$  mV



$$X_d = 5.841 \text{ S} \quad \Delta X = 35.16 \text{ mS}$$

$$Y_d = 15.4219 \quad \Delta Y_d = 351.9 \text{ mV}$$



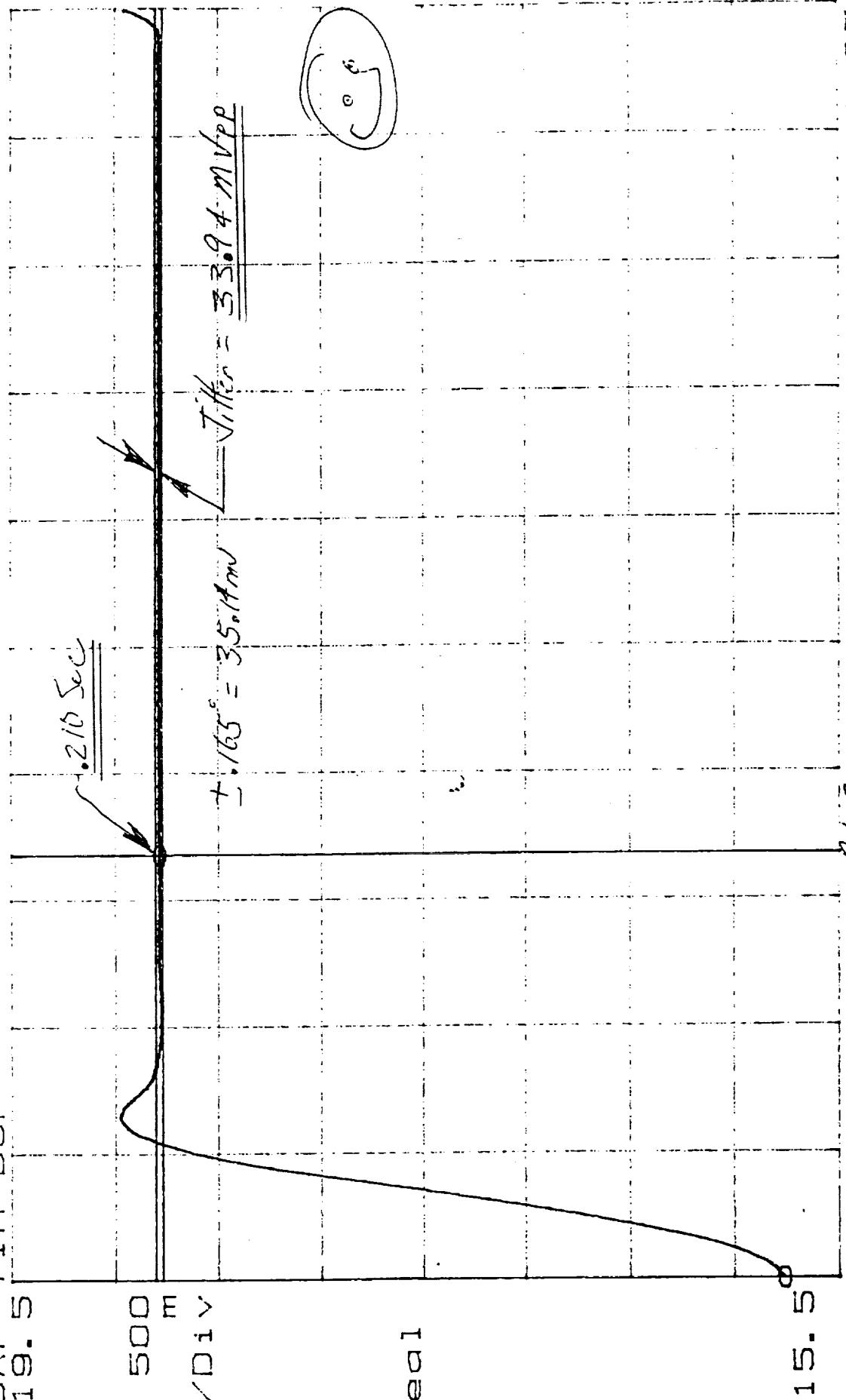
Fixd X 5.83 Sec 17-2  
S/N: 633170 Date: 1-27-77  
P/N: 1331720-2-17 SN: 107

SC29-30 Test Eng'g 3 F.F. 5  
6.05 Date: 1-27-77  
Qualt: 24 (268) JUN 22 '77

AMSU B SETY

$X = 6.043$  S    $\Delta X = 210.9$  ms  
 $Y_a = 15.7609$     $\Delta Y_a = 3.023$  V  
CAP TIM BUF  
19.5

$Y = 18.7703$     $\Delta Y = 33.94$  mV



Fxd X 6.04 Sec  
S/N: 633170  
PN: 1331720-2-1T 50:107

A/2  
3.44.5

SC30-CC

6. 67

Date 1-22-99

24  
268

Test Eng:  
Quality:

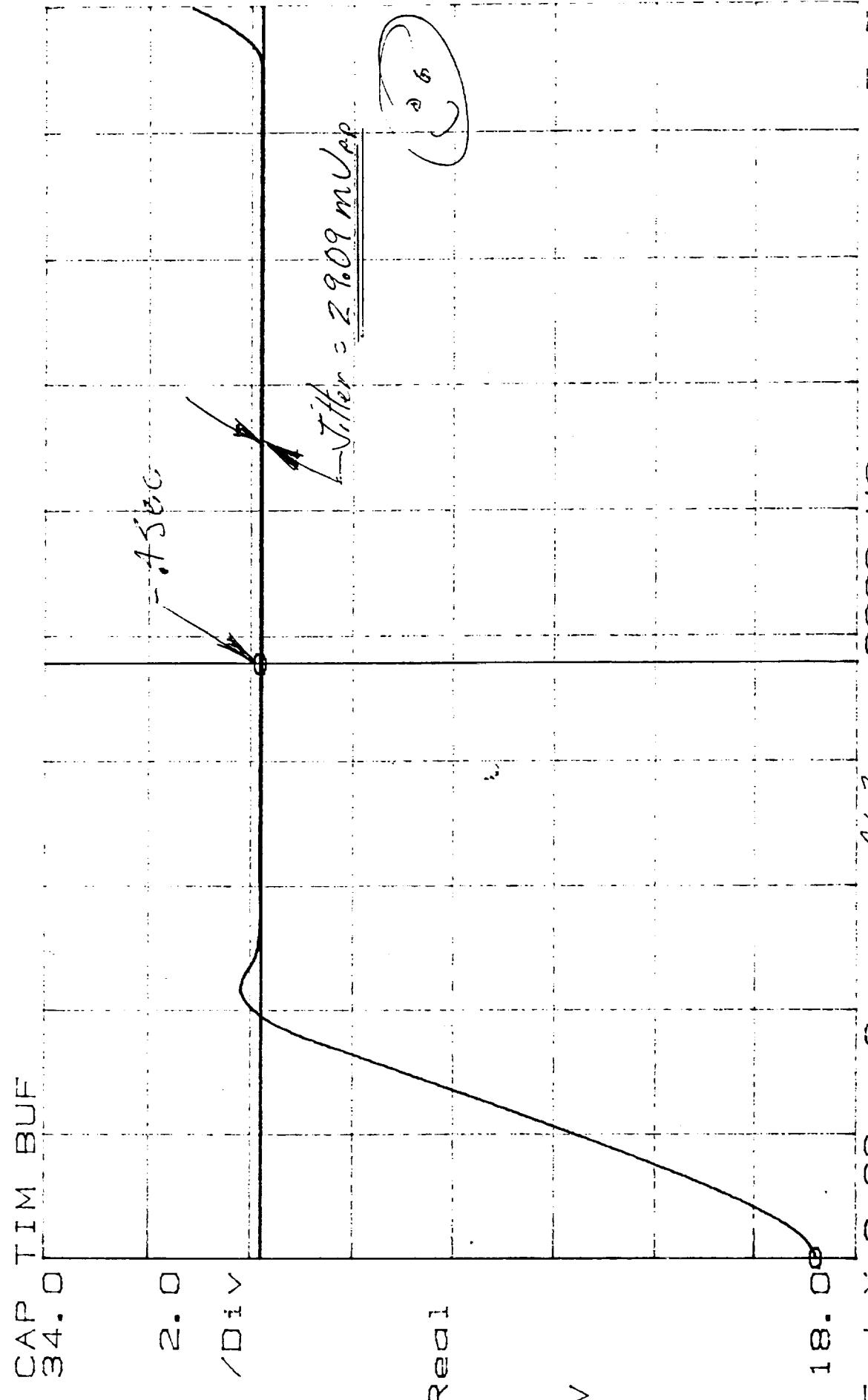
24  
268

24  
268

115.

$X = 6.661 \text{ S}$   $\Delta X = 400.0 \text{ ms}$   
 $Y_a = 18.7856 \text{ A}$   $\Delta Y_a = 11.03 \text{ V}$

$Y = 29.7721$   $\Delta Y = 29.09 \text{ mV}$



$$\omega_{\text{itter}} = 2.909 \text{ rad/sec}$$

(0.6)

Fixd  $\times 6.66$  Sec  
Slo: 633170  
Phi: 133/720-17.56' 102

SCCC-WC

A1-2  
5.1.1.5

AMCU  
SEIT

7. 5  
Art: 1-22-7-9

24  
268  
MM 28 99

**TEST DATA SHEET 7 (Sheet 1 Of 4)**  
Scan Motion and Jitter Test (A1-1) (Paragraph 3.4.4.5)

Test Setup Verified:

*Ray Hartung*  
Signature

Shop Order No. 633170

Step No.	Description	Requirement	Test Result	Pass/Fail
7	--	Stepping Slewing <8 sec period per Figure 8	< 8.0 Sec	P
9	Scene 1-2 3.33° step	<35 msec rise time per Figure 7	25.78 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	11.25 mV 0.55 mV	P
10	Scene 2-3 3.33° step	<35 msec rise time per Figure 7	28.91 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	8.533 mV 0.0 mV	P
11	Scene 3-4 3.33° step	<35 msec rise time per Figure 7	26.95 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	13.58 mV 3.65 mV	F
12	Scene 4-5 3.33° step	<35 msec rise time per Figure 7	30.47 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	17.07 mV 0.0 mV	P
13	Scene 5-6 3.33° step	<35 msec rise time per Figure 7	30.86 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	12.41 mV 0.0 mV	P
14	Scene 6-7 3.33° step	<35 msec rise time per Figure 7	26.17 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	8.146 mV 0.0 mV	P
15	Scene 7-8 3.33° step	<35 msec rise time per Figure 7	27.73 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	13.19 mV 0.16 mV	P
16	Scene 8-9 3.33° step	<35 msec rise time per Figure 7	27.73 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.13 mV 3.65 mV	P

Pass = P  
Fail = F

TEST DATA SHEET 7 (Sheet 2 Of 4)  
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
17	Scene 9-10 3.33° step	<35 msec rise time per Figure 7	27.73 Msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.68 mv 0.0 mv	F
18	Scene 10-11 3.33° step	<35 msec rise time per Figure 7	25.78 Msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	14.74 mv 0.0 mv	F
19	Scene 11-12 3.33° step	<35 msec rise time per Figure 7	28.12 Msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	12.41 mv 0.16 mv	P
20	Scene 12-13 3.33° step	<35 msec rise time per Figure 7	28.12 Msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	17.84 mv 0.16 mv	P
21	Scene 13-14 3.33° step	<35 msec rise time per Figure 7	27.73 Msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.9 mv 0.0 mv	P
22	Scene 14-15 3.33° step	<35 msec rise time per Figure 7	28.52 Msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	14.74 mv 0.0 mv	P
23	Scene 15-16 3.33° step	<35 msec rise time per Figure 7	23.05 Msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.0 mv 0.0 mv	P
24	Scene 16-17 3.33° step	<35 msec rise time per Figure 7	27.34 Msec	F
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.97 mv -1.23 mv	P

Pass = P  
Fail = F

TEST DATA SHEET 7 (Sheet 3 Of 4)  
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
25	Scene 17-18 3.33° step	<35 msec rise time per Figure 7	28.52 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.03 mv 0.0 mv	P
26	Scene 18-19 3.33° step	<35 msec rise time per Figure 7	28.52 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	17.45 mv 0.0 mv	P
27	Scene 19-20 3.33° step	<35 msec rise time per Figure 7	26.56 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.97 mv 0.0 mv	P
28	Scene 20-21 3.33° step	<35 msec rise time per Figure 7	28.52 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.97 mv 4.23 mv	P
29	Scene 21-22 3.33° step	<35 msec rise time per Figure 7	26.17 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	12.61 mv 0.0 mv	P
30	Scene 22-23 3.33° step	<35 msec rise time per Figure 7	29.69 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	17.95 mv 0.0 mv	P
31	Scene 23-24 3.33° step	<35 msec rise time per Figure 7	27.34 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	18.47 mv 1.81 mv	P
32	Scene 24-25 3.33° step	<35 msec rise time per Figure 7	26.56 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	17.55 mv 4.23 mv	P

Pass = P  
Fail = F

TEST DATA SHEET 7 (Sheet 4 Of 4)  
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
33	Scene 25-26 3.33° step	<35 msec rise time per Figure 7	26.56 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	18.42 mv 1.81 mv	P
34	Scene 26-27 3.33° step	<35 msec rise time per Figure 7	27.73 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	19.39 mv 0.0 mv	P
35	Scene 27-28 3.33° step	<35 msec rise time per Figure 7	26.95 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.01 mv 2.78 mv	P
36	Scene 28-29 3.33° step	<35 msec rise time per Figure 7	28.12 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.52 mv 0.0 mv	P
37	Scene 29-30 3.33° step	<35 msec rise time per Figure 7	27.73 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.0 mv 1.32 mv	P
38	Scene 30 Cold Cal 35.0° slew	<0.21 sec slew time per Figure 10	< 0.21 Sec	P
		< ±0.165° jitter per Figure 11	33.9 mv	P
39	Cold Cal - Warm Cal 96.67° slew	<0.40 sec slew time per Figure 12	< 0.40 Sec	P
		< ±0.165° jitter per Figure 13	29.09 mv	P

Pass = P  
Fail = FUnit: 1331720-2-1T

Test Engineer: \_\_\_\_\_

Serial No.: 107Quality Assurance: 7A 268 1-22-99Date: 1-22-99Customer Representative: R. Rausch 2/18/99

TEST DATA SHEET 8 (Sheet 1 Of 4)  
Scan Motion and Jitter Test (A1-2) (Paragraph 3.4.4.5)

Test Setup Verified: Ray Herrell

Signature

Shop Order No. 633170

Step No.	Description	Requirement	Test Result	Pass/Fail
44	--	Stepping Slewing <8 sec period per Figure 8	< 8.0 Sec	P
9	Scene 1-2 3.33° step	<35 msec rise time per Figure 7	29.3 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	10.47 mv 0.0 mv	F
10	Scene 2-3 3.33° step	<35 msec rise time per Figure 7	29.69 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.9 mv 1.25 mv	P
11	Scene 3-4 3.33° step	<35 msec rise time per Figure 7	30.86 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.13 mv 0.0 mv	F
12	Scene 4-5 3.33° step	<35 msec rise time per Figure 7	30.86 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.9 mv 0.0 mv	P
13	Scene 5-6 3.33° step	<35 msec rise time per Figure 7	28.91 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	12.02 mv 0.0 mv	P
14	Scene 6-7 3.33° step	<35 msec rise time per Figure 7	29.69 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	14.74 mv 0.0 mv	P
15	Scene 7-8 3.33° step	<35 msec rise time per Figure 7	27.73 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.51 mv 0.47 mv	F
16	Scene 8-9 3.33° step	<35 msec rise time per Figure 7	28.52 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	19.01 mv 3.96 mv	P

Pass = P  
Fail = F

TEST DATA SHEET 8 (Sheet 2 Of 4)  
Scan Motion and Jitter Test (AI-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
17	Scene 9-10 3.33° step	<35 msec rise time per Figure 7	28.91 msec	F
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.52 mv 2.8 mv	P
18	Scene 10-11 3.33° step	<35 msec rise time per Figure 7	29.3 msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	18.23 mv 5.9 mv	P
19	Scene 11-12 3.33° step	<35 msec rise time per Figure 7	26.91 msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.19 mv 3.19 mv	P
20	Scene 12-13 3.33° step	<35 msec rise time per Figure 7	30.47 msec	F
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	17.45 mv 0.0 mv	P
21	Scene 13-14 3.33° step	<35 msec rise time per Figure 7	29.69 msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	19.68 mv 0.0 mv	P
22	Scene 14-15 3.33° step	<35 msec rise time per Figure 7	30.86 msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	16.97 mv 2.12 mv	P
23	Scene 15-16 3.33° step	<35 msec rise time per Figure 7	28.52 msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	11.15 mv 5.03 mv	P
24	Scene 16-17 3.33° step	<35 msec rise time per Figure 7	28.91 msec	P
		<±5% jitter per Figure 7 < 3% overshoot for 10 msec	13.57 mv 3.09 mv	P

Pass = P  
Fail = F

TEST DATA SHEET 8 (Sheet 3 Of 4)  
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
25	Scene 17-18 3.33° step	<35 msec rise time per Figure 7	28.12 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	15.52 mv 0.18 mv	P
26	Scene 18-19 3.33° step	<35 msec rise time per Figure 7	28.12 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	16.0 mv 0.0 mv	P
27	Scene 19-20 3.33° step	<35 msec rise time per Figure 7	29.69 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	16.78 mv 0.0 mv	P
28	Scene 20-21 3.33° step	<35 msec rise time per Figure 7	29.3 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	12.58 mv 0.0 mv	P
29	Scene 21-22 3.33° step	<35 msec rise time per Figure 7	30.08 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	16.79 mv 0.0 mv	P
30	Scene 22-23 3.33° step	<35 msec rise time per Figure 7	29.69 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	9.697 mv 0.0 mv	P
31	Scene 23-24 3.33° step	<35 msec rise time per Figure 7	28.91 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	13.09 mv 0.0 mv	P
32	Scene 24-25 3.33° step	<35 msec rise time per Figure 7	28.12 msec	P
		<±5% jitter per Figure 7 <3% overshoot for 10 msec	15.51 mv 0.0 mv	P

Pass = P  
Fail = F

TEST DATA SHEET 8 (Sheet 4 Of 4)  
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
33	Scene 25-26 3.33° step	<35 msec rise time per Figure 7	28.91 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	18.91 mv 0.0 mv	P
34	Scene 26-27 3.33° step	<35 msec rise time per Figure 7	28.52 Msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	15.03 mv 0.0 mv	P
35	Scene 27-28 3.33° step	<35 msec rise time per Figure 7	28.12 Msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	14.06 mv 0.0 mv	P
36	Scene 28-29 3.33° step	<35 msec rise time per Figure 7	29.3 Msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	12.12 mv 0.0 mv	P
37	Scene 29-30 3.33° step	<35 msec rise time per Figure 7	28.91 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	13.58 mv 1.63 mv	P
38	Scene 30 Cold Cal 35.0° slew	<0.21 sec slew time per Figure 10	<0.21 Sec	P
		< ±0.165° jitter per Figure 11	33.94 mv	P
39	Cold Cal - , Warm Cal 96.67° slew	<0.40 sec slew time per Figure 12	< 0.4 Sec	P
		< ±0.165° jitter per Figure 13	29.09 mv	F

Pass = P  
Fail = F

Unit: 1331720-2-1T

Test Engineer:

ANSU  
B  
SEIT

Serial No.: 107

Quality Assurance: 12399

892  
4

Date: 1-22-99

Customer Representative: R. Brown 3/18/99

**APPENDIX C**

***PULSE LOAD CURRENT WAVEFORM  
AND TEST DATA SHEET***

$$X = 5.386 \text{ S} \quad \Delta X = 188.7 \text{ ms}$$
$$Y_d = 722.782 \mu \text{ CAP TIN } 3.0 \text{ mV}$$

CAP TIN 3.0  
mV

10.0  
mV

Real

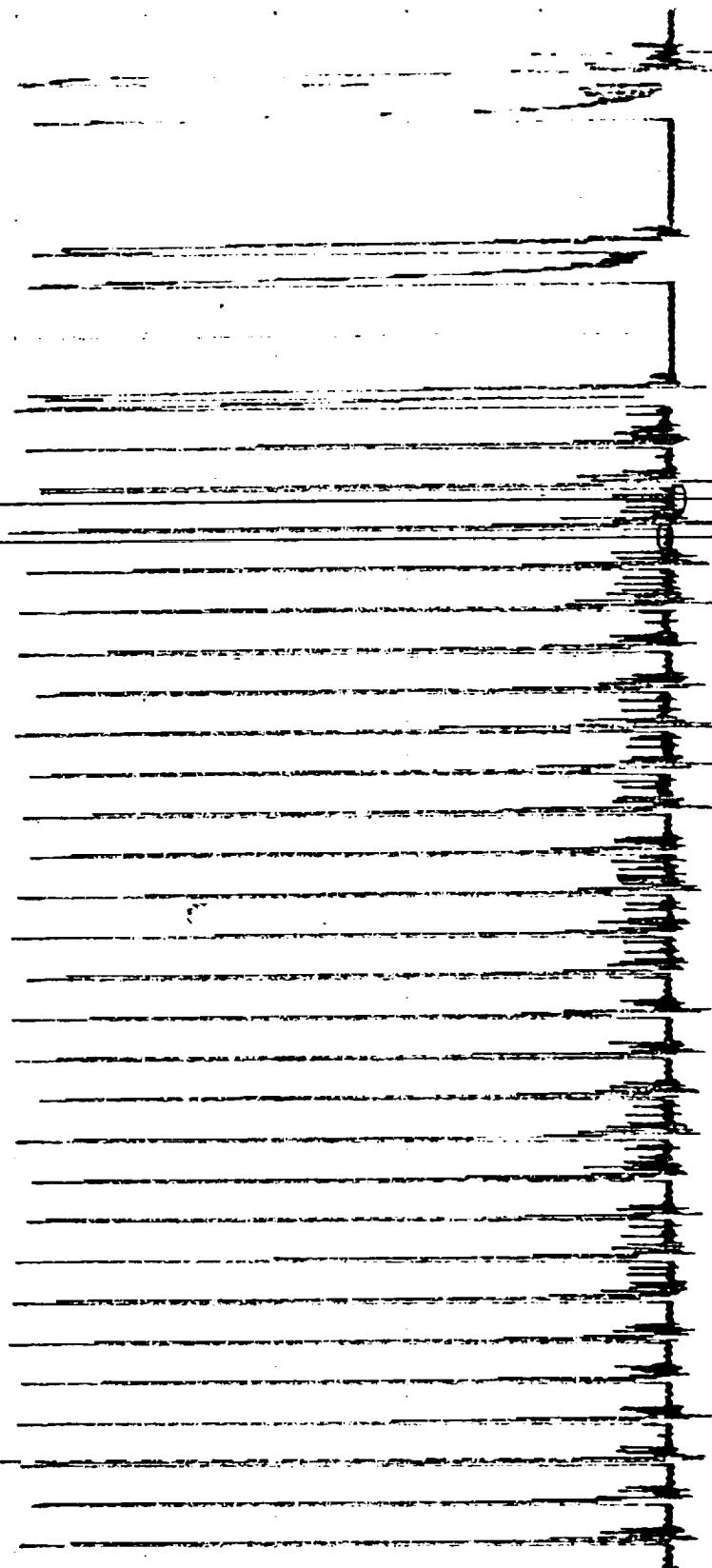
V

Zoomed

-10.0 mV  
F.x.dX.Y 0.0  
56: 633/10

Ph: 133/720-2-1T 50' 102

↙ See Expanded Plot for Current Measurement.



4PLB-C  
Test Eng:  
Qual. tr.  
Date: 1/22/99  
AMU 268  
268

8.0

1/22/99

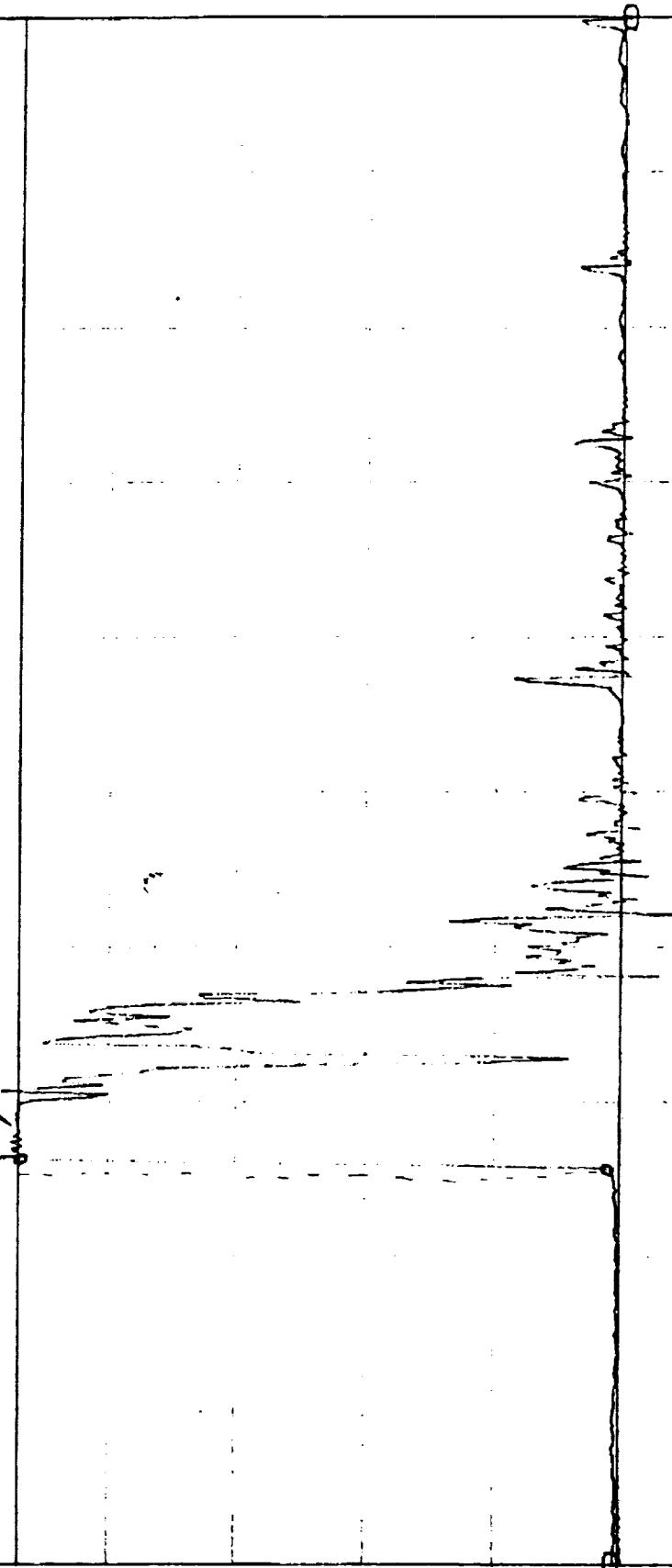
1

$X = 5.386.722.782 \mu$   $\Delta X = 1.88.7 \text{ mS}$   $Y = 47.0667 \text{ mV}$

CAP TIN BUF  
20.0 m

10.0 m  
/D i V

Rise Time = 2.34 mSec Current = 200 mA/div  $\times 4.684 \text{ div} = 936.8 \text{ mA}$



Res 1

200 mA/div

5.39 Sec  
56:633/170  
AV: 133.172.02-17 SN: 107

"EXPANDED" 4 PULS  
TEST EGQ: 3.4.7.6

ANSI SEL

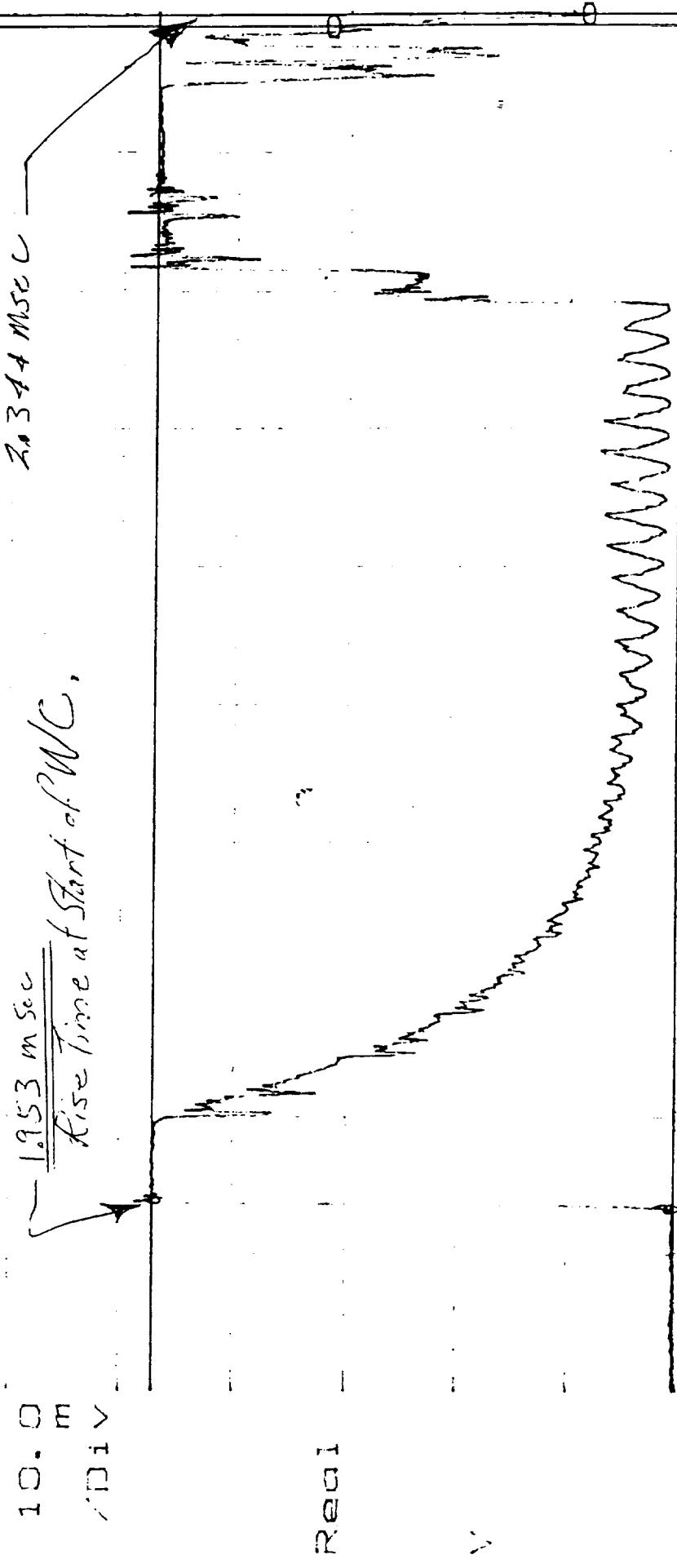
5.57

Date: 1-22-97

JUN 22 1997

$X_a = 7.704 \text{ S}$     $\Delta X = 2.344 \text{ mS}$   
 $Y_a = 8.477 \text{ S}$     $\Delta Y_a = 2.313 \text{ mV}$   
Cap. Time 53.0 ms

$Y = 47.0667 \text{ m}$     $\Delta Y = 46.84 \text{ mV}$



Fixd X: Y 7.42  
S/N 633170  
P/N 1331720-2-17 SW: 107

Sec End of PWC 4701.93-5  
Test Eng 3.44.6  
Quality A  
Date 11-22-99  
SN 229

TEST DATA SHEET 9  
28V Bus Peak Current and Rise Time Test (Paragraph 3.4.4.6)

Test Setup Verified: Ray Huppert Shop Order No. 633170

Signature

Step No.	Requirement	Test Result	Pass/Fail
4	< 1 A peak any place in the scan	936.8 mA	P
5	> 35 $\mu$ sec rise time, 3.33° step	2.344 msec	P
6	> 35 $\mu$ sec rise time, start of WC slew	1.953 msec	P
6	> 35 $\mu$ sec rise time, end of WC slew	2.344 msec	P

Pass = P  
Fail = F

Unit: 1331720-2-1T

Test Engineer: AMSU 8 SEIT

Serial No.: 107

Quality Assurance: 893 1-22-99

Date: 1-22-99

**APPENDIX D**

***GAIN AND PHASE MARGIN PLOTS  
AND TEST DATA SHEETS***

# Swept Sine

AVERAGE: INTEGR TIME  
<1.0 s

# AVG'S  
5

FREQ:  
START 999.99 mHz  
STOP 1 kHz

SPAN  
RESLTN  
3.0 Dec  
33.3 Pt/Dec

EST TIME EST RATE  
9.17 Min 183 s/Dec

DIR  
UP  
Log

AU GAIN: OFF

INPUT:  
CH 1 RANGE AutoRng↑ ENG 1.0 V/EU COUPLING DC <F1 t>  
CH 2 AutoRng↑ 1.0 V/EU DC <F1 t>

SOURCE: TYPE  
OFF

5/6: 633/70  
P/N: 1331720-2-1T SN: 107

3.4.48

Test Eng:   
Date: 1-13-21  
Quality: 

LEVEL OFFSET  
1.0 VPK 0.0 VPK

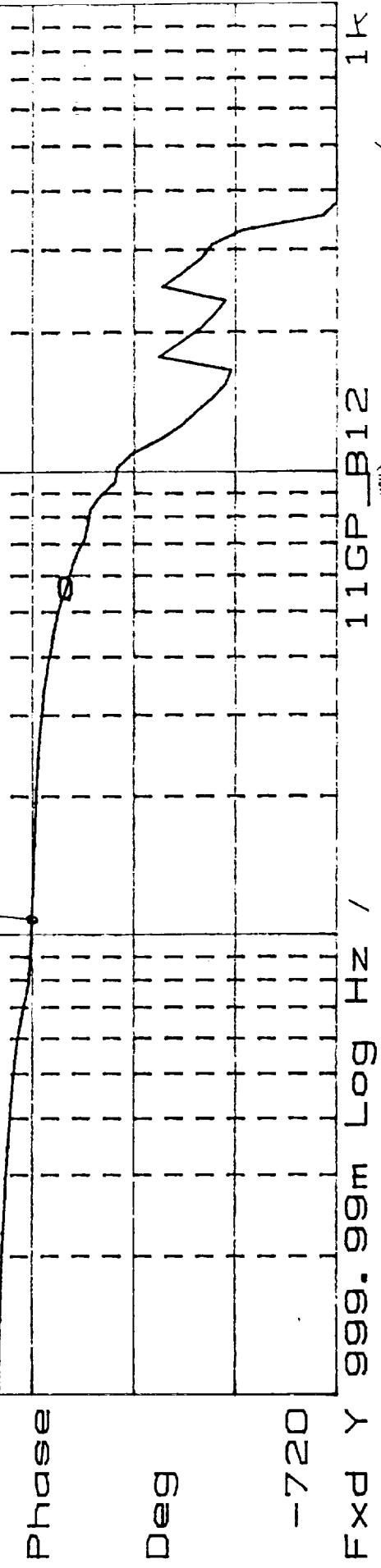
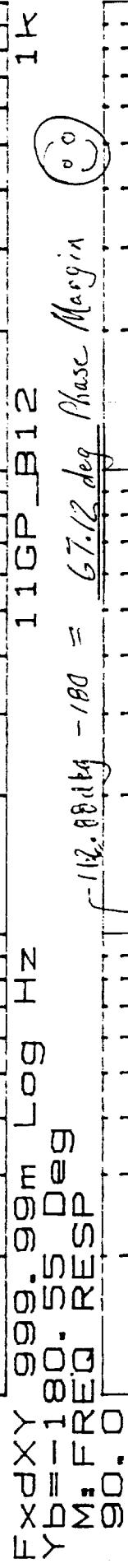
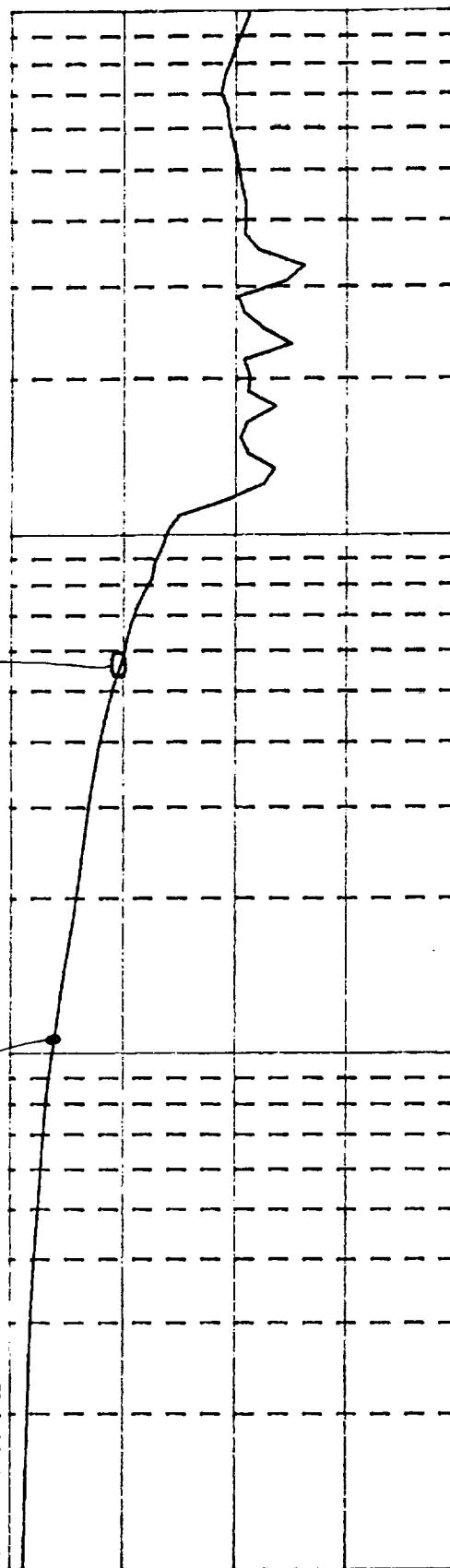


$X = 56$ ,  $396 \text{ Hz}$   
 $\alpha = -14.304 \text{ dB}$

M: FREQ RESP

10.0

dB



S/N: 133/170 SN: 107  
Date: 1-12-99

Test Eng:  
A1-1

AMTU  
B  
Best

Date: 1-12-99

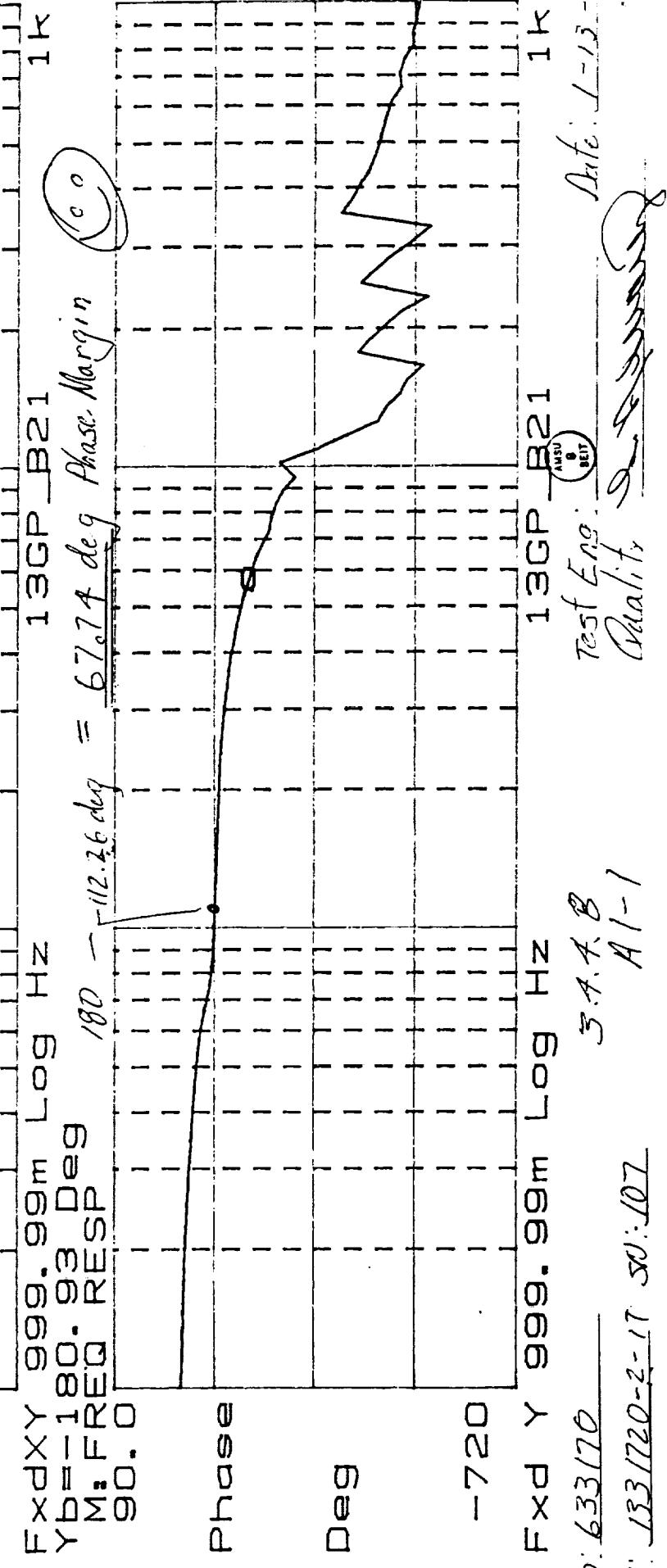
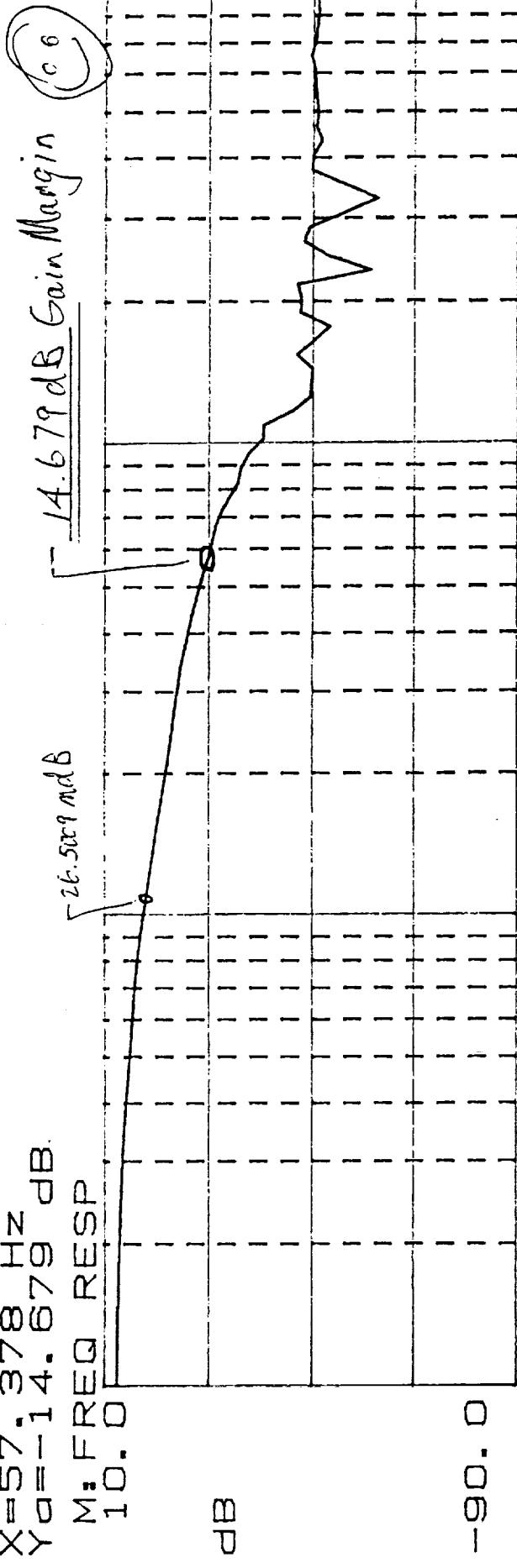
Qualit, ~~good~~

11

$$X = 57.1378 \text{ Hz}$$

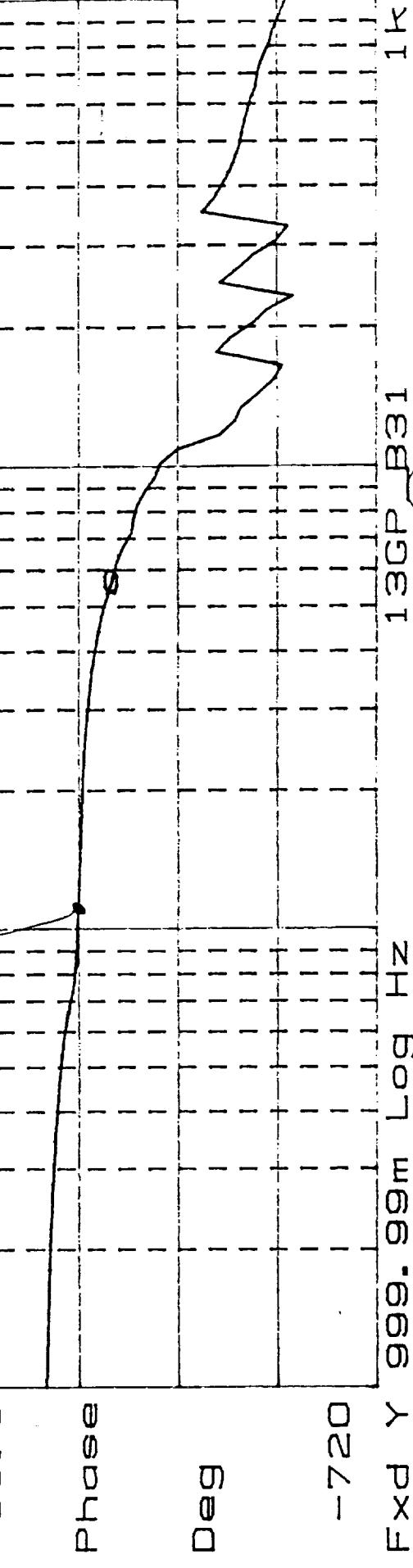
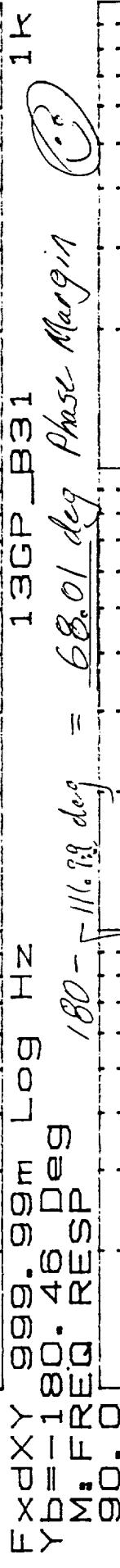
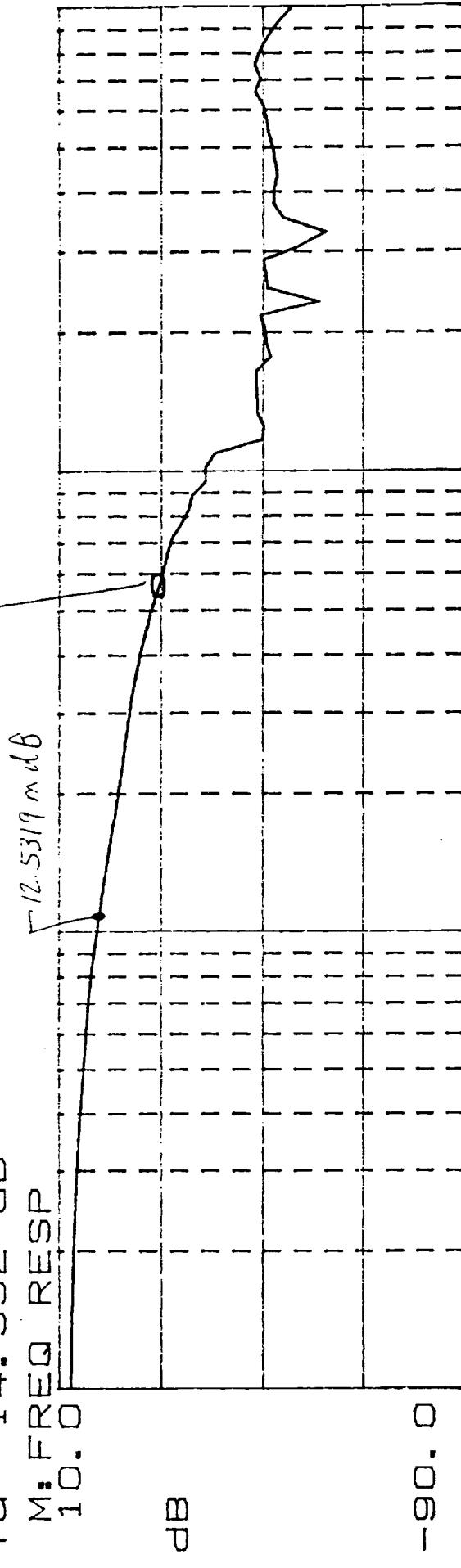
$$Y_a = -14.679 \text{ dB}$$

$\sqrt{26.5 \times 9 \text{ m} \cdot \text{dB}}$



(1)

-14.532 dB Gain Margin



SN: 133720-2-1T SN: 102

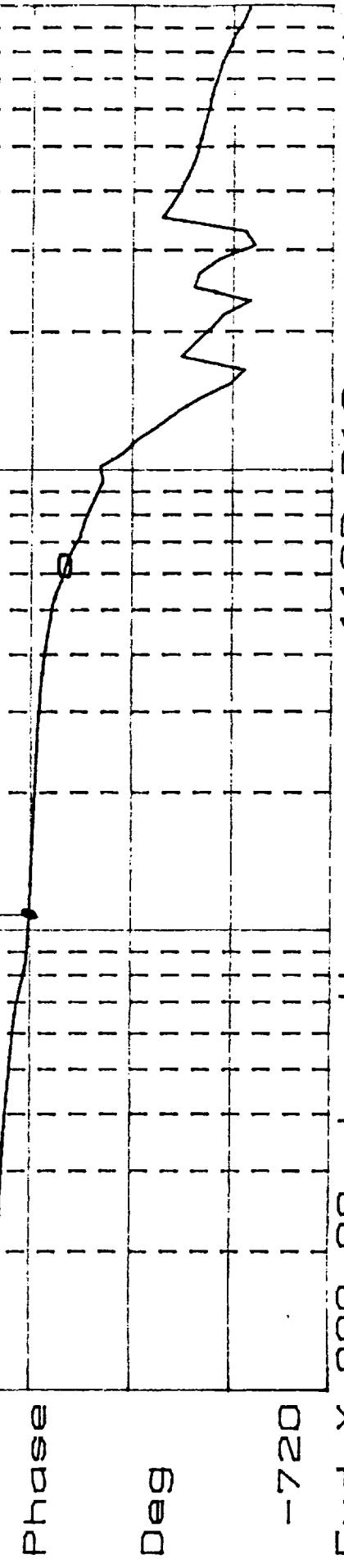
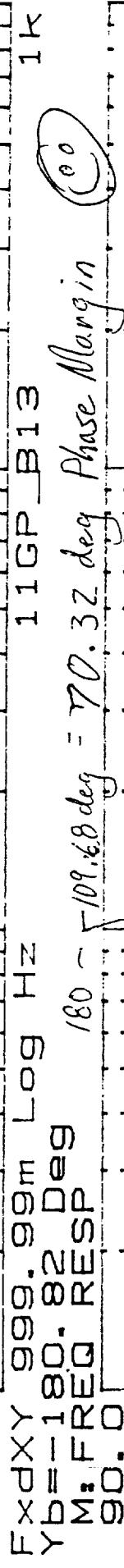
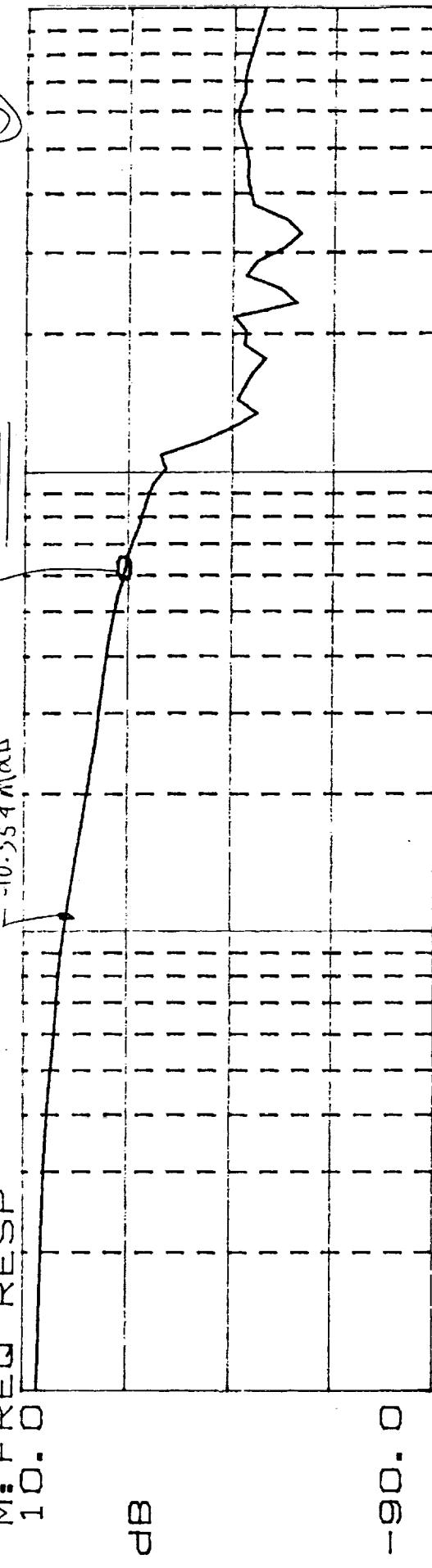
Date: 1-15-99

Qualit. Dr. John

11/21/99

11/21/99

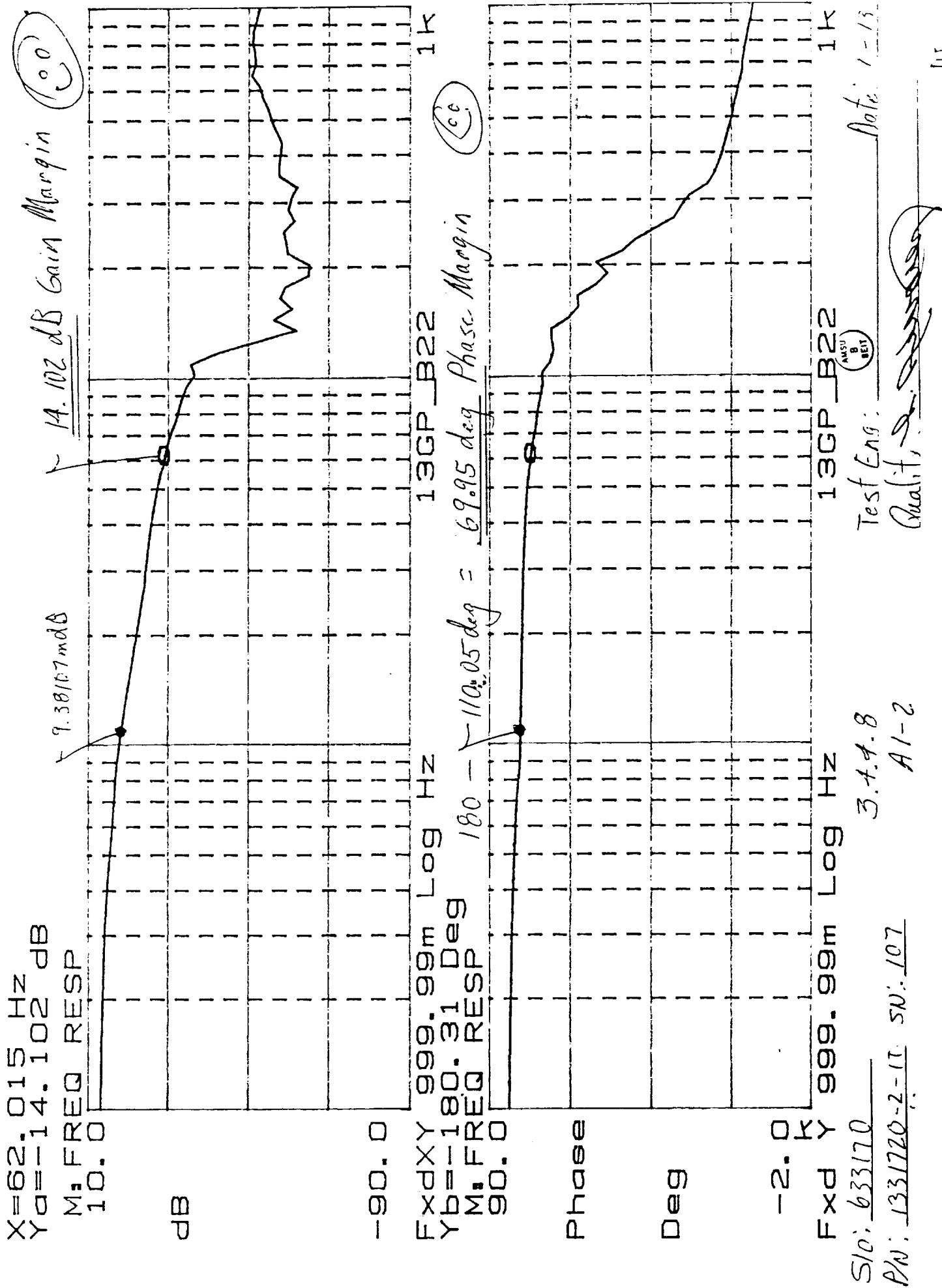
$X = 62.553 \text{ Hz}$   
 $Y_a = -14.34 \text{ dB}$   
M: FREQ RESP

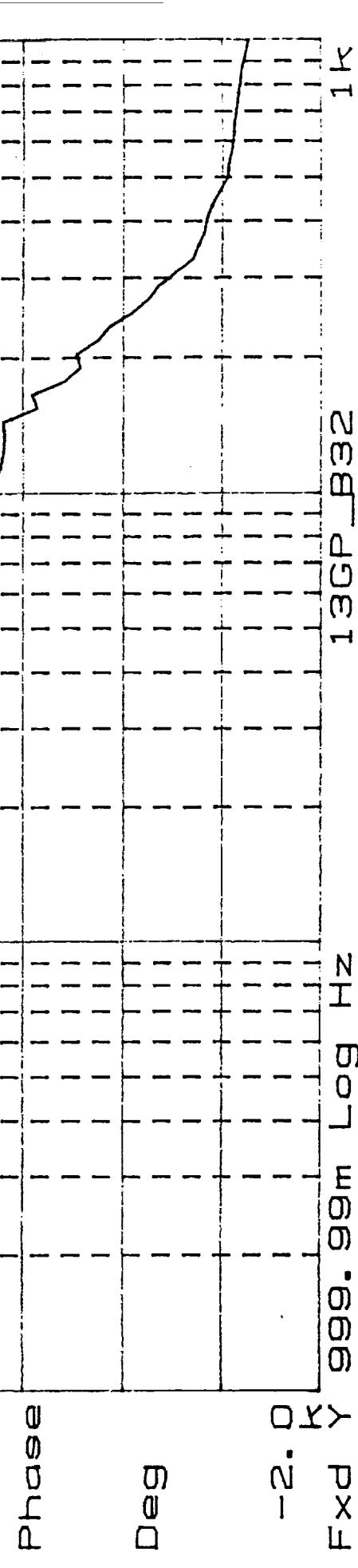
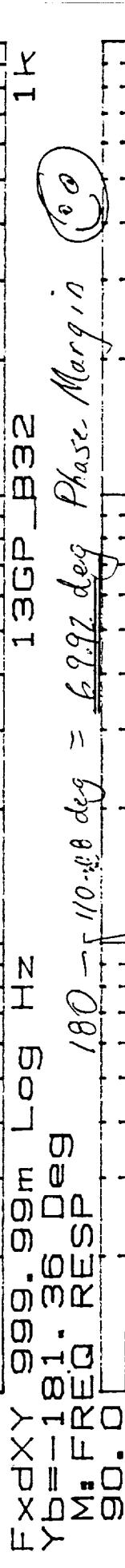
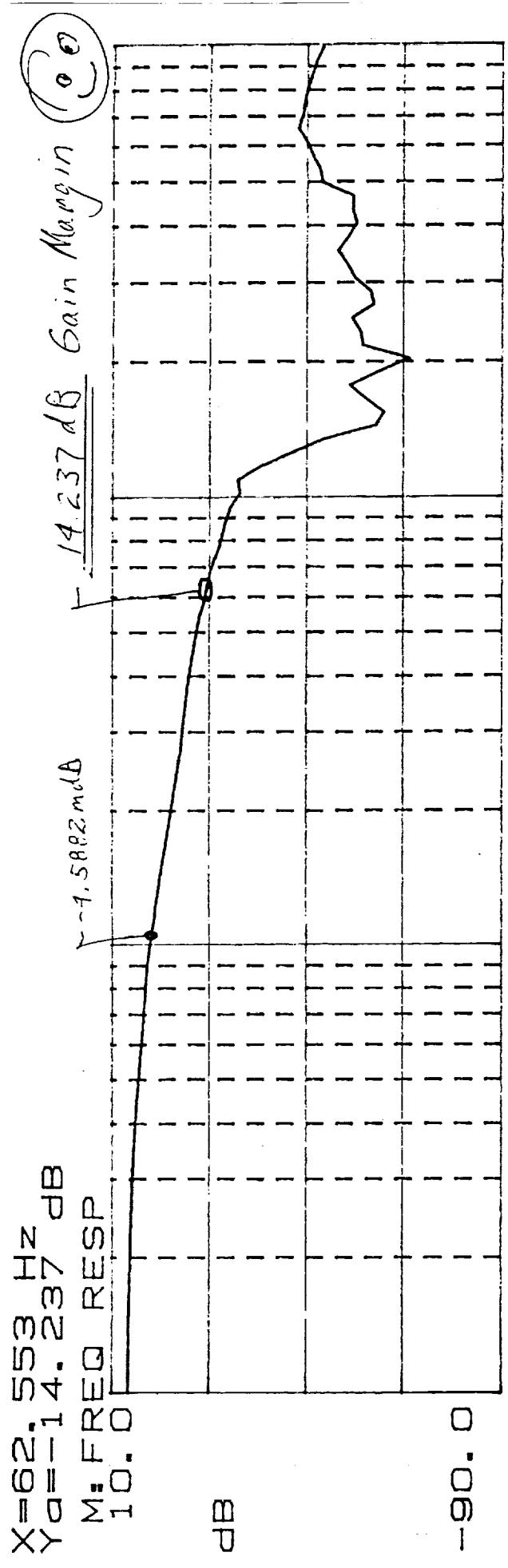


$F_{xd} = 999.99 \text{ mHz}$   
 $Y_b = -170.5 \text{ Deg}$   
M: FREQ RESP

Date: 1-1-99  
Test Eng: 3-4-4-B  
Plot: A1-2

$\text{SN: } 1331720-2-11$





Date: 1-12-17  
 Test Eng:  
 Qualtr. Good  
 111

TEST DATA SHEET 10  
Gain/Phase Margin (A1-1) (Paragraph 3.4.4.8)

Test Setup Verified:

*P. H. Ferguson*  
Signature

Shop Order No.

633170

Temperature:

68.5 °F  
°C

Requirement	Test Result		Pass/Fail
9.2 dB minimum	1	14.304 dB	F
	2	14.679 dB	
	3	14.532 dB	
25 degrees minimum	1	67.12 deg	F
	2	67.74 deg	
	3	68.01 deg	

✓

Pass = P  
Fail = F

Unit: 1331720-2-1T



Test Engineer:

Serial No.: 107

Quality Assurance: (7A) 268 JAN 28 '99

Date: 1-22-99

Customer Representative: R. Ferguson 2/18/99

TEST DATA SHEET 11  
Gain/Phase Margin (A1-2) (Paragraph 3.4.4.8)

Test Setup Verified: P. D. Thompson  
Signature

Shop Order No. 633170

Temperature: 68.5 °F  
20 °C

Requirement	Test Result		Pass/Fail
9.2 dB minimum	1	14.34 dB	P
	2	14.102 dB	
	3	14.237 dB	
25 degrees minimum	1	70.32 deg	P
	2	69.95 deg	
	3	69.92 deg	

Pass = P  
Fail = F

Unit: 1331720-2-1T  
Serial No.: 107  
Date: 1-22-99

Test Engineer: \_\_\_\_\_  
Quality Assurance: 7A 268 JUN 28 99  
Customer Representative: D. D. Thompson 2/18/99



**APPENDIX E**

***OPERATIONAL GAIN MARGIN POWER SPECTRUM  
PLOTS AND TEST DATA SHEETS***

Linear Regression and Correlation

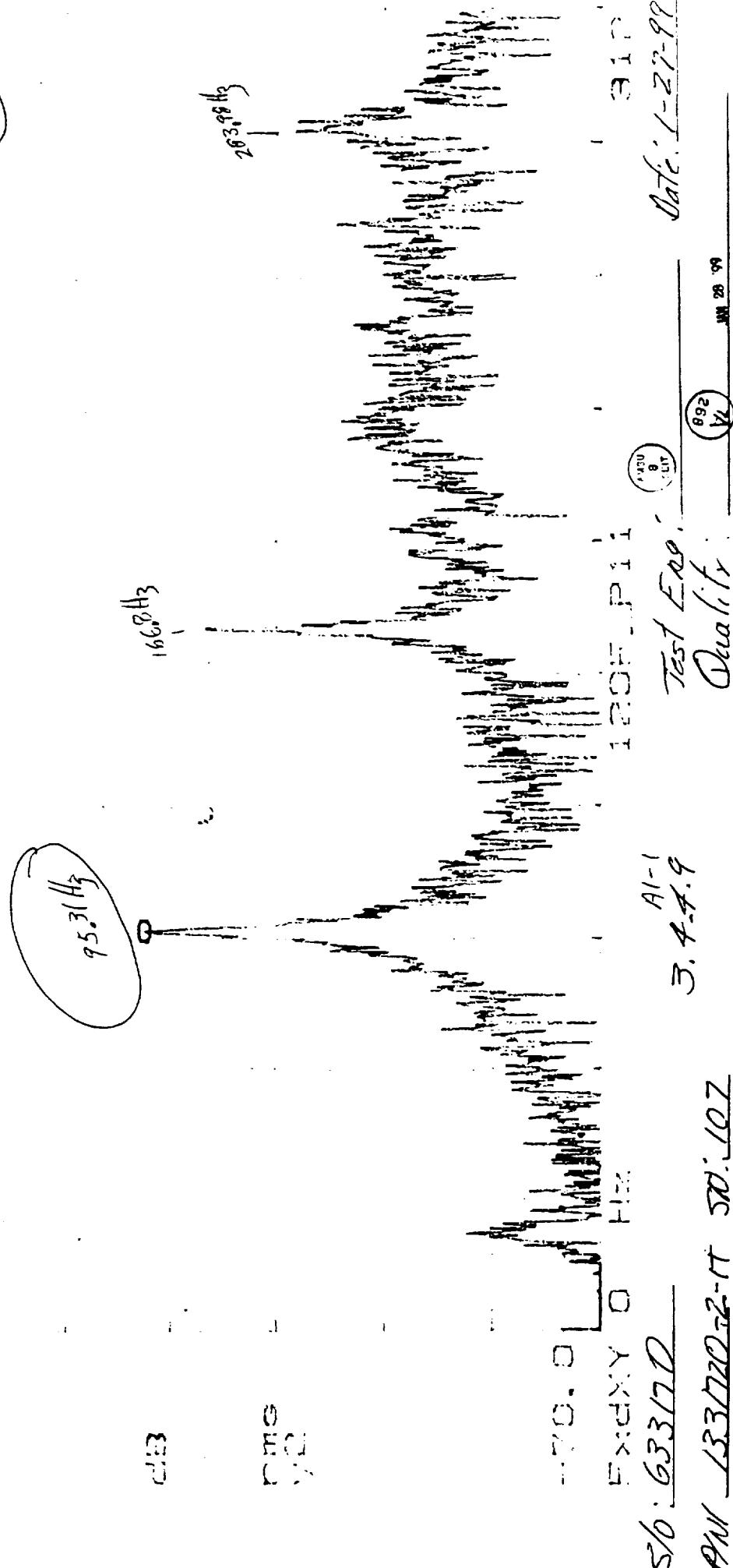
MEASURE:	CHAN 1	CHAN 2
	OFF	Power Spec
WINDOW:	CHAN 1	CHAN 2
	Uniform	Uniform
AVERAGE:	TYPE: Stable	# AVG'S 3
FREQ:	CENTER 156.25 Hz	OVERLAP 0%
	REC LENGTH 2.56 S	SPAN 312 Hz
	REC LENGTH Δt ↴ 1.25ms	BW 39.1 mHz
TRIGGER:	TYPE: Chan 2	SLOPE Neg
	LEVEL 0.0 Vdc	PULSE NEW Off
INPUT:	RANGE: Autoring CH 1	ENIG UNITS 1.0 V/ENIG
	Autoring CH 2	DC (Fit) DC (Fit)
SOURCE:	TYPE: Off	LEVEL 0.0 Vpk
	5/5/633/70	OFFSET 0.0 Vdc
	PN: 133/720-2-17	DATE: 1-2-98
	SN: 007	893
	Qualit.	893

X=95.31 Hz  
Yd=-27.521 dBVrms  
Power Spec. 2  
P.O. 10.

4. 事の上に  
5. 事の上に  
6. 事の上に  
7. 事の上に  
8. 事の上に  
9. 事の上に  
10. 事の上に

100

$$\begin{aligned}P_{50} &= 20K \\P_{90} &= 41.77K \\ \text{Gain Margin} &= \underline{\underline{9.24 dB}}\end{aligned}$$



$X = 95.31 \text{ Hz}$   
 $Y_d = -33.144 \text{ dBVrms}$   
Power Spec

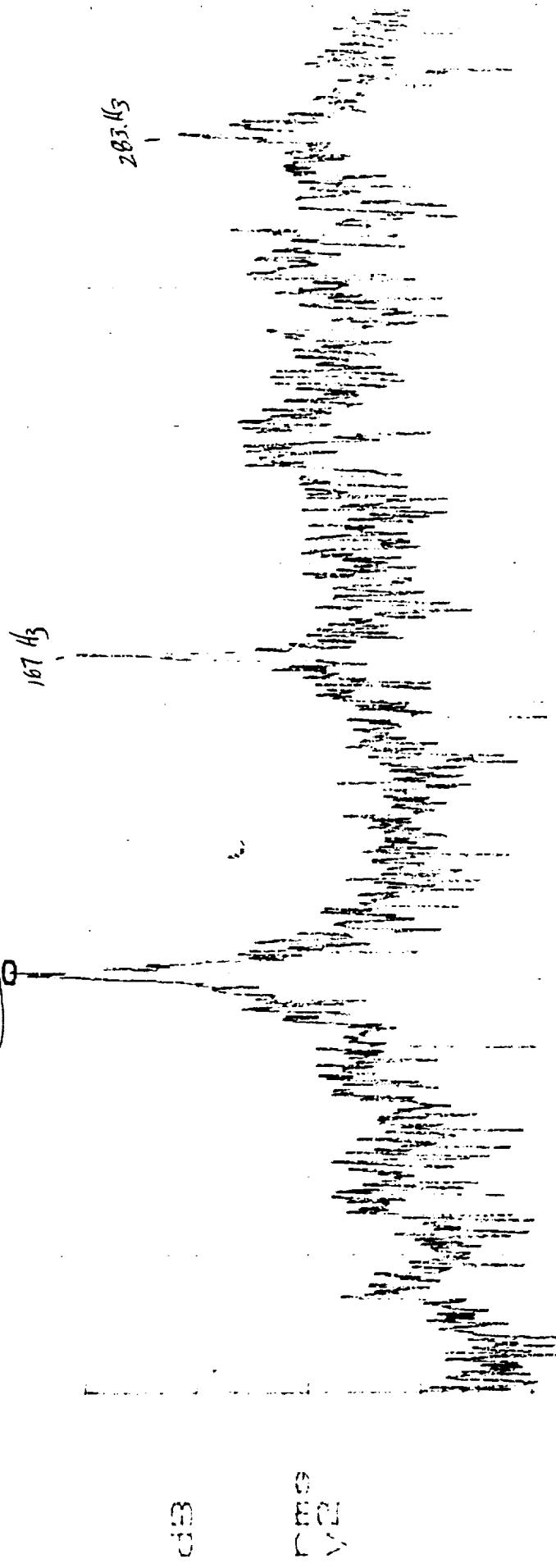
3.4.2.1 Date: 12.2.99

$$R_{5\theta} = 20K$$
$$R_{pot} = 43.2K$$

$$\underline{\text{Gain Margin}} = 9.43 \text{ dB}$$

10.0  
10.1 V

95.31 Hz



1300-1321  
11.11.1  
11.11.1  
11.11.1

SN: 633170  
DN: 1331720-2-1T 5A.10.7

A1-  
3.4.2.9

ANSU  
B  
BETT  
Date: 12.2.99  
Qualit: A

1300-1321  
11.11.1  
11.11.1  
11.11.1

3.4.2.9  
Date: 12.2.99

$$X = 94.92 \text{ Hz}$$

$$Y = -24.431 \text{ dBVrms}$$

POWER SPEC

10.0

10.0

Div -

dB

rms  
Vc

-70.0

FREQUENCY

500.633170

PN 133170-2-17 SW.107

SWEEPING UNITS

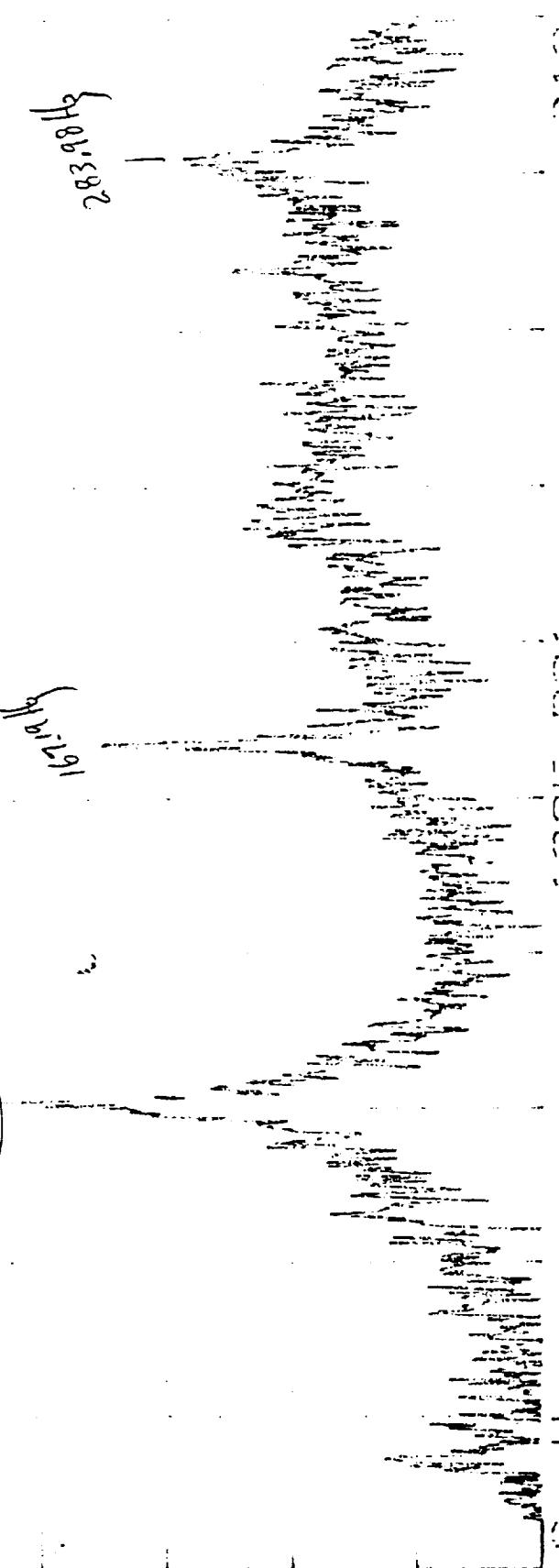
$R_{56} \approx 20K$

$R_{pot} = 43.30K$

Gain Margin = 9.46 dB

94.92 dB

0



161.98

94.92

1.33170-2-17 SW.107  
A1-1  
3.44.9  
S/N 633170  
Qualit 692 899  
Date 11-22-81  
Test Eng. 8 AUG 81  
BETT

Page 14

X = 94.53 Hz  
Y<sub>a</sub> = -23.311 dBVrms  
POWER SPEC

DIV 10.0

$$R_{SA} = 21K$$
$$R_{Prot} = 41.07K$$

Gain Margin = 8.983 dB

/DIV

94.53 Hz

c/s

rms  
v2

-70.0

Feedback 0 Hz

s/n: 63.3120

3.7.7.9

120F - F12

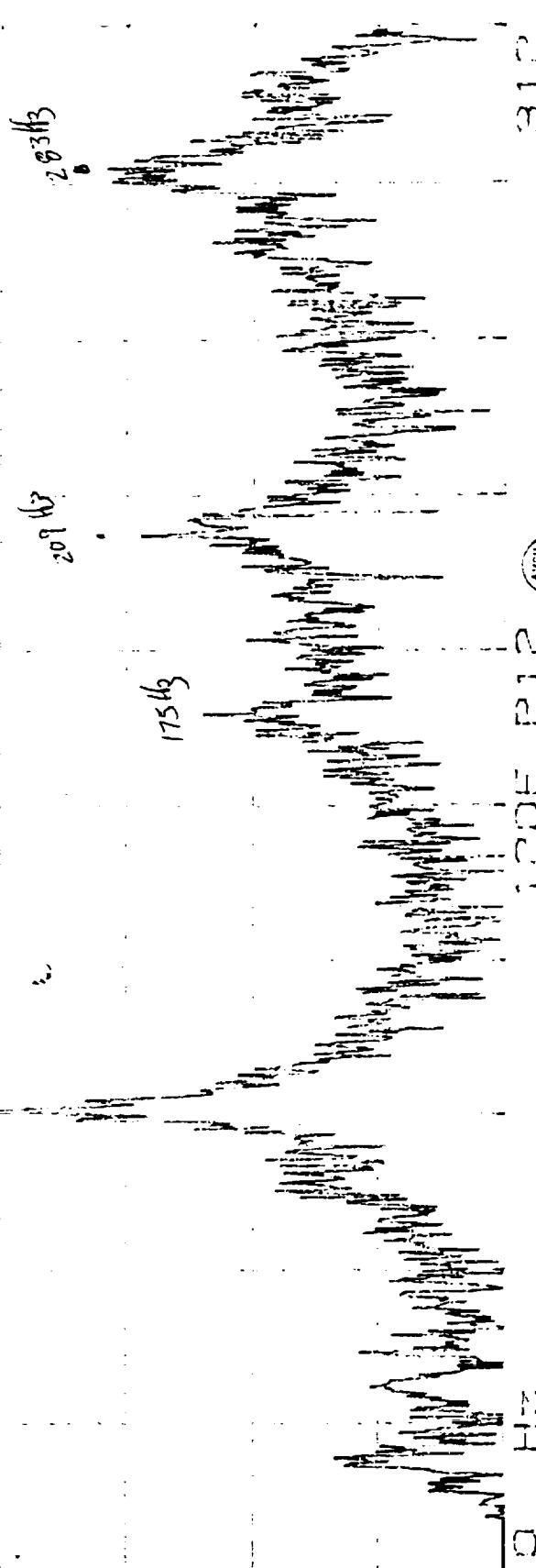
Test Eng:

Qualit:

31.0

Date: 1-22-99

MM 28 '99



$X = 94.14 \text{ Hz}$   
 $Y_d = -29.637 \text{ dBVrms}$   
POWER SPEC

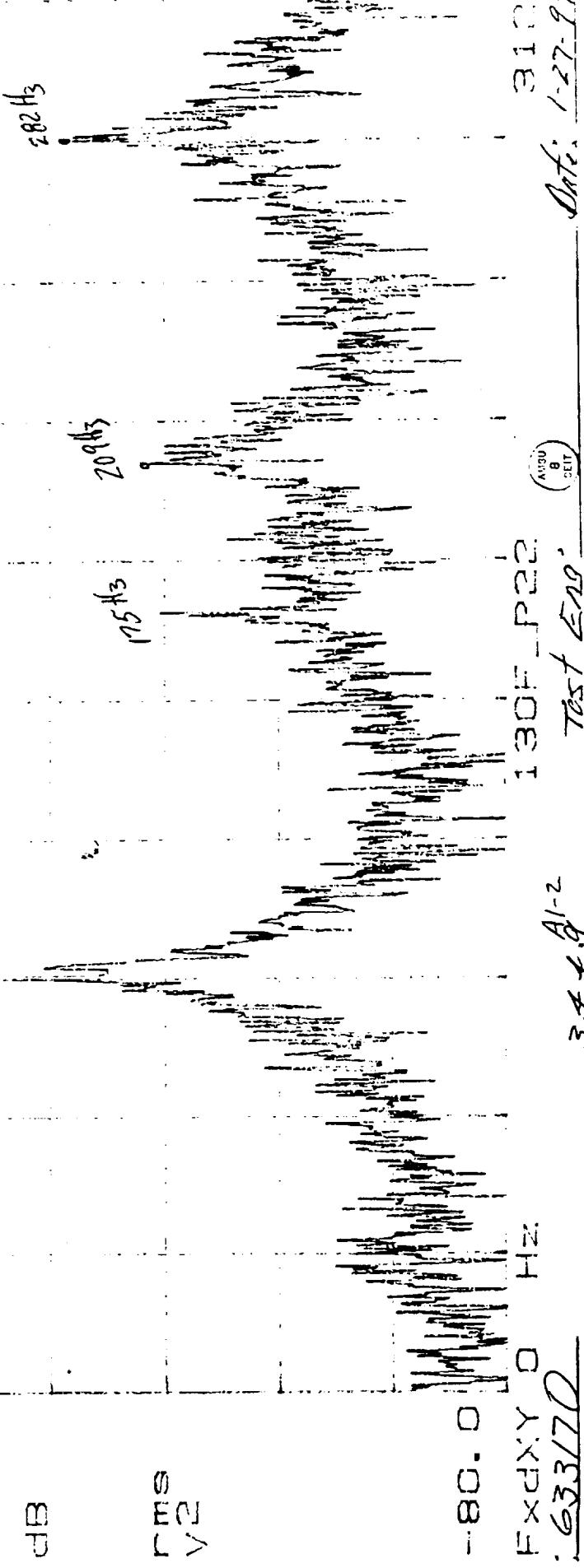
DIV 0.00001 F Limif

$$R_{SO} = 21\text{k}$$
$$R_{hot} = 42.46\text{k}$$

$$\underline{\text{Gain Margin}} = 9.08 \text{ dB}$$

(C)

1 DIV



FREQ: 63.3 Hz  
AVG: 8  
TEST END

130F\_F22  
Date: 1-27-99  
Qualit: 662

3100  
Date: 1-27-99  
JAN 28 1999

HW: 133/720-2-11 ST: 107

100

$X = 94.14 \text{ Hz}$   
 $Y = -24.853 \text{ dBVrms}$   
POWER SPEC2  
10.0

Dividing unit

$$R_S = 21\text{k}$$

$$R_{pot} = 41.58\text{k}$$

$$\underline{\text{Gain Margin}} = 8.967 \text{ dB}$$

Dividing

94.14 Hz

cIB

rms  
v2

-70.0

Fx dy.v C Hz

56: 63320

PW: 133120.2-1T SW: 107

A1-2  
3.7x.9

130F-P32

Test Eng:

Quality: 89%

310

Date: 1-27-99

28.00

17 3

TEST DATA SHEET 12  
Operational Gain Margin (A1-1) (Paragraph 3.4.4.9)

Test Setup Verified:

*Ray Hulberg*  
Signature

Shop Order No. 633170

Temperature: 61.8 °C

Step No.	Requirement	Test Result		Pass/Fail
11	R58 Resistance (kohms)		20 K	P
	Test Pot Resistance (kohms)	1	41.77 K	
		2	43.2 K	
12	Oscillation Frequency (Hz)	3	43.38 K	P
		1	95.3 Hz	
		2	95.3 Hz	
16	Gain Margin, 8 dB minimum	3	94.92 Hz	P
		1	9.24 dB	
		2	9.43 dB	
		3	9.46 dB	

Pass = P  
Fail = F

Unit: 1331720-2-1T

Test Engineer: \_\_\_\_\_



Serial No.: 107

Quality Assurance: \_\_\_\_\_



Date: 1-27-99

TEST DATA SHEET 13  
Operational Gain Margin (A1-2) (Paragraph 3.4.4.9)

Test Setup Verified:

*Ray Hergenrother*  
Signature

Shop Order No. 633170

Temperature: 61.8 °C

Step No.	Requirement	Test Result		Pass/Fail
11	R58 Resistance (kohms)		21 K	P
	Test Pot Resistance (kohms)	1	41.7 K	
		2	42.46 K	
12	Oscillation Frequency (Hz)	3	41.58 K	P
		1	94.53 Hz	
		2	94.14 Hz	
16	Gain Margin, 8 dB minimum	3	94.14 Hz	P
		1	8.983 dB	
		2	9.08 dB	
		3	8.967 dB	

Pass = P  
Fail = F

Unit: 1331720-2-1T

Test Engineer: \_\_\_\_\_



Serial No.: 107

Quality Assurance: \_\_\_\_\_



*BB 99*

Date: 1-27-99

REPORT DOCUMENTATION PAGE		Form Approved OMB No. 0704-0188	
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1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED	
4. TITLE AND SUBTITLE  Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report		5. FUNDING NUMBERS  NAS 5-32314	
6. AUTHOR(S) D. Luu			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Aerojet 1100 W. Hollyvale Azusa, CA 91702		8. PERFORMING ORGANIZATION REPORT NUMBER  11421 9 March 1999	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) NASA Goddard Space Flight Center Greenbelt, Maryland 20771		10. SPONSORING/MONITORING AGENCY REPORT NUMBER  ---	
11. SUPPLEMENTARY NOTES  ---			
12a. DISTRIBUTION/AVAILABILITY STATEMENT  ---		12b. DISTRIBUTION CODE  ---	
13. ABSTRACT (Maximum 200 words)  This is the Performance Verification Report, AMSU-A1 Antenna Drive Subsystem, P/N 1331720-2, S/N 107, for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).			
14. SUBJECT TERMS  EOS Microwave System		15. NUMBER OF PAGES  ---	
		16. PRICE CODE  ---	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT SAR

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INPUT FROM: D. Luu	CDRL: 208	SPECIFICATION ENGINEER: N/A	DATE	
CHECKED BY: N/A		DATE N/A	JOB NUMBER: N/A	
APPROVED SIGNATURES			DEPT. NO.	DATE
Product Team Leader (A. Nieto)			8341	3/10/99
Systems Engineer (R. Platt)			8341	3/10/99
Design Assurance (E. Lorenz)			8331	3/11/99
Quality Assurance (R. Taylor)			7831	3/11/99
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1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED	
	March 1999	Contractor Report	
4. TITLE AND SUBTITLE	Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report		5. FUNDING NUMBERS
6. AUTHOR(S)	D. Luu		NAS5-32314
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9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS (ES)	National Aeronautics and Space Administration Washington, DC 20546-0001		10. SPONSORING / MONITORING AGENCY REPORT NUMBER
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14. SUBJECT TERMS		15. NUMBER OF PAGES	
EOS, Microwave System		60	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

